Intel® Express 550T Routing Switch

User Guide

696939-004

Year 2000 capable

An Intel product, when used in accordance with associated documentation, is "Year 2000 Capable" when, upon installation, it accurately stores, displays, processes, provides, and/or receives data from, into, and between the twentieth and twenty-first centuries, including leap year calculations, provided that all other technology used in combination with said product properly exchanges date data with it.

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Preface

Information sources for this switch

This User Guide is one of three sources of information delivered with this switch.

Information type...	Given in...
Getting started quickly	Quick Start (printed)
How to customize your switch	User Guide (printed)
Context sensitive help	Help (online)

Quick Start description

A printed guide that describes these basic steps:

- Connect the switch
- Start the switch (using the default settings)
- Start Intel Device View
- Change the setup
- Save a new setup to the memory
- Access Local Management
- And, the legal declarations and warnings

User Guide description (this guide)

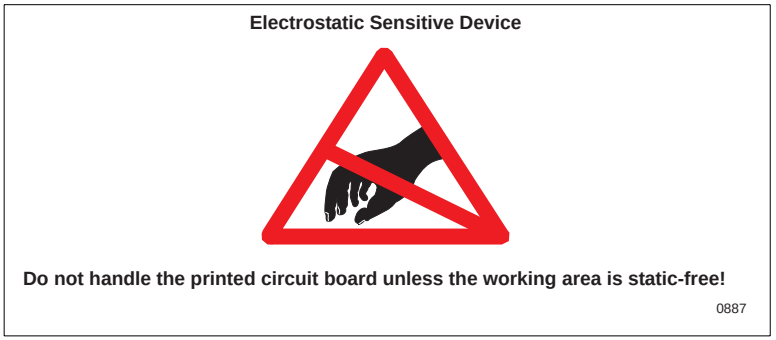
A printed guide containing full instructions on how to install the switch and operate the switch using Intel Device View.

Help description

Online, context-sensitive help text for each dialog box, providing information about the permitted limits for the parameters used.

Warning

Electrostatic Sensitive Device



Products covered

This User Guide gives you instructions on how to use:

- Intel Express 550T Routing Switch
- Intel Device View

Prerequisite knowledge

This User Guide is intended for personnel authorized to configure and manage local area networks. We assume that the person has an advanced technical background within data communication and networks.

Opening this product must be done only by a network manager or person who is qualified and authorized to install electrical equipment, and who is aware of the hazards to which he/she is exposed. This person must have an advanced technical background within data communications and networks.

Conventions in this manual

This manual uses the following conventions:

File names, commands and examples

All file names, commands and examples are shown in the `COURIER` typeface.

Menu and submenu names

Menus, for example File or View, are shown in normal typeface with lowercase and uppercase letters displayed as shown on the screen.

Access to submenus

You access submenus using a menu hierarchy. These are shown by use of angle brackets and the courier typeface. For example, `File>Configuration>Setup` shows that to select the Setup submenu you must first click File and then Configuration.

Acronyms

ARP	Address Resolution Protocol
ASIC	Application-Specific Integrated Circuit
AUI	Attachment Unit Interface
BPDU	Bridge Protocol Data Unit
CRC	Cyclic Redundancy Check
DHCP	Dynamic Host Configuration Protocol
DVMRP	Distance Vector Multicast Routing Protocol
ICMP	Internet Control Message Protocol
IGMP	Internet Group Message Protocol (for IP Multicast)
IEEE	Institute of Electrical and Electronic Engineers
IP	Internet Protocol
LAN	Local Area Network
MIB	Management Information Base
RAM	Random Access Memory
RMON	Remote Monitoring
RIP	Routing Information Protocol
RSVP	Resource Reservation Protocol
SNMP	Simple Network Management Protocol
STP	Spanning Tree Protocol
TFTP	Trivial File Transfer Protocol
ToS	Type of Service
UDP	User Datagram Protocol
VLAN	Virtual Local Area Network

1 Intel Express 550T Routing Switch

In this chapter

This chapter covers the following topics.

Topic	See Page
Introduction to the product	2
Front Panel	3
Rear Panel	5
Installation	5

Introduction to the product

Purpose of the switch

The Intel Express 550T Routing Switch uses your existing network cables to integrate switching technology into your computer network.

Each device in a workgroup or a network segment can communicate at a full wire-speed of 10 Mbps or 100Mbps to provide:

- High-speed connectivity
- Simultaneous two-way communication between connected devices
- Increased network throughput and performance
- Increased server availability

Physical features

This switch offers the following features:

- Plug-and-play—no need to configure the module to use the basic operations
- 8 x 10/100 Mbps, non-blocking connections
- Two option slots for modules
- Front panel LEDs that show switch, port and traffic status
- Automatic detection of 110 V and 240 V power supplies

Hardware features

The switch offers the following features:

- Each port can operate in one of three switching modes: cut-through, fragment-free or store-and-forward
- Each port supports half- and full-duplex operation
- Simultaneous full wire-speed switching on all ports
- RMON support for Statistics, History, Alarm, Host, HostTopN, Matrix, Filter, Capture and Events
- Full RMON support on a limited number of ports
- Switch routing: IP and IPX protocols
- Spanning tree support on all ports
- Flow control
- Permanent MAC address entries

Software features

The switch offers the following features:

- Intel Device View for Windows* 95, Windows* 98 and Windows NT* or Intel Device View for Web
- Adaptive forwarding mode
- Local Management via a direct terminal connection or via TELNET
- SNMP Management support
- BOOTP and TFTP support
- Control over user access rights
- Creation of virtual LANs
- Stand-alone (per switch or stack) or distributed (switch network) VLAN
- IP Multicast
- RSVP
- ToS (Type of Service)
- IP Filtering

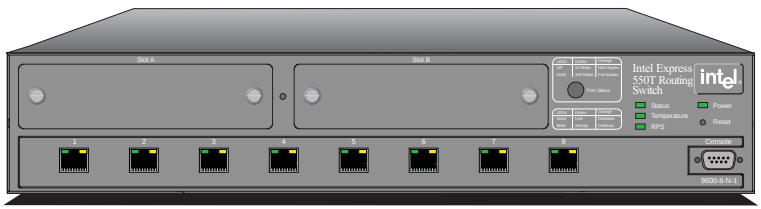
Front Panel

Introduction

The LEDs on the front panel show the status of the ports, so you should position the switch with the front panel facing you. You can also see which ports the cables are connected to on the switch.

View of the front panel

The front panel of the switch is shown below:



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Front panel ports

These ports are on the front panel:

Port	Function
CONSOLE port (DB-9)	Connects a PC (running a VT100 emulation), a VT100 terminal or a modem to access the built-in Local Management program.
8 x 10/100Base-TX ports (RJ-45)	Connects devices using Unshielded Twisted Pair (UTP) cabling complying to EIA 568A Category 5 or ISO/IEC 11801 Category 5 level D.

Slots for modules

After removing one or both of the cover plates, the modules can be inserted to expand the functionality of the switch.

Front panel LED functions

The LEDs on the front panel have the following functions:

LED	Shows the status for...
Port LEDs - Green and Orange	The operation of each port.
Status	The operation of the switch.
Power	The internal power supply.
Temperature	The internal temperature.
RPS (redundant power supply)	The external, redundant power supply.

Buttons

The buttons on the front panel have the following functions:

Button name	Function
Port Status	Shows the operational status of each port.
Reset	Reset or enter Maintenance Mode or Recovery Mode

Rear Panel

Introduction

The rear panel has a cooling fan outlet and the main supply cable, so you should position the switch with the rear panel facing away from you.

View of rear panel

The rear panel of the switch is shown below:

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Rear panel parts

The switch's rear panel has the following parts:

Part	Function
Fan outlet	Cools the internal circuitry of the switch.
Power connection	A socket to connect the power cord to the main supply.
Redundant power supply connector	Connects an external redundant power supply. If the internal power supply fails, the redundant power supply starts immediately.

Installation

Important

You must adhere to all local and national regulations governing the installation and connection of electrical devices when installing the switch.

Before Installation

Contents of the pack

Unpack the switch carefully and check that these parts are present:

Item	Present?
One Intel Express 550T Routing Switch	
One power cord (suitable for your power outlet)	
One mounting kit	
One CD-ROM	
One Console cable	
One Quick Start	
One User Guide (you are reading it)	
Late-breaking News	
Intel Support Service papers	

Check the package contents

If you have not received all of the parts, or any of the parts are damaged, contact your dealer immediately.

Keep all the packaging materials in case you need to repack the switch.

Check all labels

Read all labels and rating plates on the switch. If there is anything that you do not understand, or if any of the information provided does not appear to comply with your local or national rules and regulations, consult your dealer before proceeding with the installation.

Essential reading

It is important that you read the following:

- "Late-breaking News".

  This contains essential information you should be aware of when installing and using the product; for example, limitations and compatibility issues.
- Warnings and the instructions earlier in this guide.
- The `README.TXT` file on the CD-ROM. This gives a general description of the software and specific requirements.

Positioning and Installing the Switch

Allow adequate ventilation

The switch contains two fans to air-cool the internal circuitry. The air is drawn in from the left of the unit and expelled through the outlet grills on the right side and the rear.

To ensure correct airflow, leave 100 mm (4 inches) free space on both sides and behind the switch. Do not allow the intake or outlet grills to become blocked.

On a desktop

To install the switch in a desktop environment:

1. Find the four rubber feet in the pack that contains the rack mounting kit.
2. Remove the backing strip from each of the four feet.
3. Attach the four rubber feet to the underside of the switch (to ensure that the switch stands firmly).
4. Place the switch on a stable, flat surface.
5. Ensure that the air intake (on the left) and fan outlets (on the right side and rear) are not blocked.

   Warning The switch's lifetime and operational reliability can be seriously degraded by inadequate cooling.

Rack requirements

Install the switch in a standard rack in accordance with IEC 297 (or similar); if the minimum outside measurements of the rack are 600 x 600 mm (23.5 x 23.5 inches), you must allow 190 mm (7.5 inches) of space at the rear.

Mounting kit

The switch is delivered with a kit to attach it to a standard 19-inch equipment rack (with side support rails). The kit contains two mounting brackets and four screws (for attaching the brackets to the sides of the switch).

Tools required for positioning in a rack

In addition to the mounting kit, you need the following items to mount the switch in a rack:

- Standard 19-inch rack with side support rails.
- 3 mm screwdriver.

- Customer-supplied screws for securing the switch in the rack.

  Mounting screws are not provided because the required sizes may vary from rack to rack.

In an equipment rack

To mount the switch in a standard equipment rack:

1 Attach the mounting bracket marked “Left” to the left-hand side of the switch, and attach the mounting bracket marked “Right” to the right-hand side of the switch, using the four screws provided.

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Make sure that you attach the mounting brackets to the correct sides. Otherwise the switch will not align correctly in the equipment rack.

2 If the four rubber feet prevent the switch from standing firmly on the equipment rack’s side support rails, remove them.

3 Set the switch in the equipment rack, and make sure there is adequate space for air flow around the switch (see “Allow adequate ventilation” in “Positioning and Installing the Switch”, p. 7).

4 Screw the mounting brackets securely to the equipment rack.

Ambient temperature

If the switch is installed in a closed or multi-rack assembly, the operating ambient temperature of the rack environment may be greater than the ambient temperature of the room. Make sure that the temperature of the rack environment does not exceed the recommended operating temperature for the switch.

Installing a Module

Introduction

You can increase the connectivity options of your switch by installing a module.

Warning Modules are not designed to be installed in, or removed from, the switch while it is in operation. You must power off the switch before attempting to install or remove a module.

Static-free working area

The module's printed circuit board is an Electrostatic Sensitive Device and should be handled only in a static-free working area; otherwise, the printed circuit board may fail or be degraded.

Avoiding damage to the circuit board

If you remove the plate covering the slot on the front of the switch, for example, to install or remove a module, follow this procedure to avoid damage to your printed circuit board:

Warning Do not remove the plate unless the switch is disconnected from the main power supply.

1. Disconnect the switch from the main power supply.
2. Ground the switch before you handle the printed circuit board.
3. Connect yourself to a non-painted/non-isolated part of the grounded switch (for example the back panel) using a wrist strap with 1MΩ resistance to ensure that you carry the same electrostatic charge as the enclosure.
4. Remove the plate covering the slot.

Installing a module

To install a module:

1. If the switch is already operational, disconnect it from the main power supply.
2. Follow the instructions in "Avoiding damage to the circuit board" above.
3. Unscrew the screws of the plate covering the slot on the front of the switch. Save these screws and plate.
4. Insert the module into the slot (following the instructions in the module's User Guide). Place your thumbs just beneath the screws on the front panel of the module and push in the module. Secure it using the retaining screws.

Removing the module

To remove a module:

1. If the switch is already operational, disconnect it from the main power supply.
2. Follow the instructions in “Avoiding damage to the circuit board” above.
3. Unscrew the screws securing the module.
4. Pull the module gently to disengage the connectors fully from the socket on the motherboard. Slide the module out completely.
5. Cover the empty module port with the plate and secure using the screws.

Connecting Other Devices

Introduction

Incorrect cabling is often the cause of network configuration problems

Use shielded cables

Shielded cables normally comply with EMC and FCC emission limits.

Only use unshielded cables when it is explicitly specified in the installation manual of the device in question.

Cables for the LAN Ports

Ports on the switch are wired MDI-X, so use the following cable:

If you connect the switch to a...	Then use a...
Workstation or server	Straight-through cable 1:1
Device with MDI-X ports (for example another Intel switch or hub)	Crossover cable
Device with MDI ports	Straight-through cable 1:1

RJ-45 connector pin assignments

The RJ-45 ports on the front of the switch have the following pin assignments:

Pin number	Function
1	RX+
2	RX-
3	TX+
6	TX-

Connecting a device to the RJ-45 ports

To connect a workstation compatible with IEEE 802.3 (Ethernet Version 1.0 and 2.0) or a fast access device (such as a server) to the switch's RJ-45 ports using UTP cable (Category 5):

1 Make sure that the device has a 100Mbps (100Base-FX or 10/100Base-TX) network interface card installed.

If not, use your network interface card's documentation to install and configure it correctly.

2 If your workstation is fitted with an RJ-45 interface then there is no problem. However, it is possible to attach to other connector types using an appropriate adapter. For example, use a UTP/10Base-FL adapter for fiber connections

3 Connect one end of the UTP cable to an RJ-45 port on the switch.

According to IEEE 802.3, the cable length must not exceed 100 meters (approximately 325 feet).

4 Connect the other end to the 100Base-TX connection on the device.

Connecting the management PC

To manage the switch from a PC connected directly to the switch, the PC must not use frame tagging. To manage the switch from a PC with IEEE 802.1Q tagged frames, management must be through a device which untags the frames.

Cable for the Console Port

If you connect a PC (via the Console Port), then use a null-modem cable.

Connecting the Power

Introduction

After connecting the devices to the switch, connect the power cable. There are certain practical and safety considerations to be made before powering the switch on.

The Power Cable

Ground warning

The switch is delivered with a power cable that fits the power sockets in your country. If this is not the case, contact your dealer immediately and ask for the correct power cable.

Power cable wiring color code

The wires in the power cable provided are color coded:

Color	Connection
Green and yellow	Ground
Blue	Neutral
Brown	Live

Important for UK use

If the colors of the wires in the power cable provided do not correspond with the markings that identify the terminals in your plug:

1. Make sure that the green and yellow wire is connected to the terminal marked with the letter E, or with the ground symbol ⏚, or is colored green and yellow.
2. Make sure that the blue wire is connected to the terminal marked with the letter N or colored black.
3. Make sure that the brown wire is connected to the terminal marked with the letter L or colored red.

Power supply to a rack

If the switch is installed in a rack, make sure the rack's power supply socket has a ground connection and the rack is connected to a branch supply or a power supply socket with a ground connection.

To avoid overloading the circuit and damaging the wiring of the power supply, the power supply to the rack must be adequate to cover the extra power consumed by the switch.

Power up

Powering up the switch

Follow these steps to power up the switch:

1. Push the female end of the power cable into the main socket (in the rear panel); plug the other end into the power supply outlet.
2. Make sure that the Power LED (on the front panel) is green.

   If it isn't green, make sure that the power outlet is working correctly (switched on). If the power outlet is on and the Power LED is not green, then there is a fault within the switch and you must contact your dealer.
3. Verify that an LED is lit for each of the front panel ports where a powered on device is connected.

Start-up procedure

Immediately after power-up, the following should happen during start-up:

Stage	STATUS LED...	Then the switch...
1	Is red	Is starting up
2	Turns to steady green	Has started successfully

If the Status LED remains red, then the switch has not started successfully. Try to restart it; if the switch does not start, contact your dealer.

Look at the other front panel LEDs during start-up and check that they are operating correctly.

Port LED states

The LEDs reflect the state of each port:

LED	Indicates
No lights	Port enabled, no link.
Green, blinking randomly	Port enabled, RX/TX traffic, link pulse active.
Green, solid	Port enabled, link pulse active.

LED	Indicates
Green and Orange both blinking randomly	Collision detected (with half duplex). Port enabled, link pulse active.
Orange, solid	Port disabled by management.
Green and Orange both solid	Port disabled by a hardware fault, or no hardware connected.

Default settings after start-up

Once the switch has started successfully, installation is complete and the switch is using its default setting (also known as default configuration):

- All ports are enabled.
- All ports operate in auto-negotiation mode.
- Spanning Tree is disabled on all ports.
- Addresses that have been silent for more than 15 minutes are purged from the switch's address table (the MAC Address Aging time).
- No access restrictions to Local Management (Telnet).
- No SNMP restrictions.
- No permanent MAC address entries defined. A permanent entry is a MAC address that is defined as being permitted only on a certain port. This can be a useful security feature.
- All ports are in the same VLAN (named <System>) and VLAN mode (Stand-alone mode). VLANs allow you to create virtual networks using specific switch ports, IP addresses, IP subnets and MAC addresses.
- Flow Control is enabled on all ports.
- The connection with Local Management is timed-out after 10 minutes if there has been no input during this period.

After start-up

This default configuration is adequate for simple workgroup environments to operate in basic switching mode.

Although the switch continues to operate without problems, we recommend that you change certain parameters to suit your own requirements.

Follow the instructions in Chapter 2 to change the configuration while the switch is operating.

Other LEDs on the front panel

Introduction

There are three other LEDs and one button on the front panel that show how the switch is operating:

- Status LED
- Temperature LED
- Redundant Power Supply (RPS) LED
- Port Status button

LED colors and their meanings

The LEDs give information about the state of the switch:

LED	Color	Meaning
Status	Green	Solid: The switch is operating normally.
		Blinking (1 Hz): Updating software or running in recovery mode.
		Blinking (5 Hz): Running in maintenance mode.
	Red	The switch is resetting, or either hardware or software errors are detected.
Temperature	Green	Normal operating temperature.
	Orange	Temperature is higher than normal. Check that the area around the air intakes and vents are clear of obstructions.
	Red	Temperature is too high and the switch will shut down.
RPS	Green	Off: No RPS connected.
		Solid: RPS connected, but not needed.
	Orange	Normal power supply has failed and the RPS has taken over.

Port Status button

To see the speed and duplex settings of all the ports, press the `Port Status` button. The function of the port LEDs changes for a period of 5 seconds, where they have the following meaning:

LED	Color	Meaning
Left (Speed)	Green	Off: 10Mbps
		Solid: 100Mbps
Right (Duplex)	Orange	Off: Half duplex
		Solid: Full duplex

2 Intel Device View

In this chapter

This chapter covers the following topics.

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System Requirements

Requirements for Intel Device View under Windows

You need a PC with the following minimum requirements to run Intel Device View:

- Microsoft Windows NT workstation or server, version 4.0, or Microsoft Windows 95 or Microsoft Windows 98. (Windows NT 4.0 English language version workstation recommended.)
- A network adapter installed.
- 30 MB of free hard disk space.
- A color display with 800 x 600 resolution and 256 colors.
- The Microsoft IP protocol must be installed and configured before installation of Intel Device View.

DHCP limitation

Three important things to know:

- Do not use a PC running Windows NT server (with its DHCP server installed) to run Intel Device View.
- Ensure the IP address for the PC is not changed by the DHCP server.
- PCs that use a network management system that uses BootP, DHCP or SNMP Trap Receiving, may have their network management system disabled by Intel Device View.

Management PC restrictions

To manage the switch from a PC connected directly to the switch, the PC must not use frame tagging. To manage the switch from a PC with IEEE 802.1Q tagged frames, management must be through a device which untags the frames.

Requirements for Intel Device View on the Web server

You need a PC with the following minimum requirements to run Intel Device View:

- One of the following running: Microsoft Windows NT 4.0 Server with Internet Information Server (IIS) 2.0 or later; or Windows NT Workstation with Peer Web Services.
- 30 MB of free hard disk space.
- The Microsoft IP protocol must be installed and configured before installation of Intel Device View.

Web server restrictions

To manage the switch from a web server connected directly to the switch, the web server must not use frame tagging. To manage the switch from a web server with IEEE 802.1Q tagged frames, management must be through a device which untags the frames.

Requirements for Intel Device View on the Web client

To run Intel Device View, the client requires:

- Microsoft Internet Explorer (4.00) running on Windows 95 or Windows 98 or Windows NT 4.0.
- A color display with a minimum of 800 x 600 resolution and 256 colors.

Requirements for Intel Device View with plugin

To run Intel Device View with a plugin, the PC must be running HP OpenView* or Intel LANDesk Manager.

Installation and Removal

To start the installation of Intel Device View

Normally, the Setup program for Intel Device View will start automatically after you insert the compact disc (CD) in your CD ROM drive. However, if it does not, use the standard Windows procedures for installing programs. A screen similar to the one below is displayed:

To install Intel Device View for Windows

Click `Install Windows` and follow the on-screen instructions. When the installation is complete, Intel Device View will start automatically when “Launch Intel Device View” is selected.

To install Intel Device View for Web

Click `Install Web` and follow the on-screen instructions. When the installation is complete, Intel Device View will start automatically when “Launch Intel Device View” is selected.

To install Intel Device View when using HP OpenView* or Intel LANDesk® Manager

Click `Install Plugin` and follow the on-screen instructions. When the installation is complete, Intel Device View starts automatically when “Launch Intel Device View” is selected.

Removal of Intel Device View

Removal under Windows

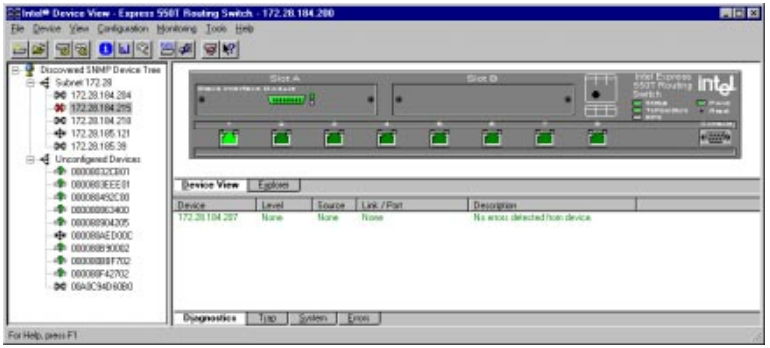
To remove Intel Device View under Windows:

1. Close all Intel Device View programs.
2. Use standard Windows procedures to uninstall Intel Device View.

Using Intel Device View

Concept

Intel Device View configures all the parameters on your switch, or group of switches known from here on as a stack, (via SNMP) and monitors their activities.



Navigating through Intel Device View

Many commands are available from within Intel Device View. These are best accessed using mouse actions. However, Windows users can also access most of them through the menu bar.

The Intel Device View window

There are three sections:

- Device Tree — displays the separate branches on your LAN, including a branch showing all unconfigured devices.
- Interactive picture of the switch, or stack — shows the port state or the Explorer, which provides port and VLAN details for the switch or stack.
- Information section — provides details about diagnostics, traps, errors and the system. Using this window, you can show activity statistics for the switch (or the stack) and for individual ports.

Before a switch is contacted

Basic menu bar commands

Before a switch or stack is contacted, the following commands are available through the menu bar. The toolbar buttons are for users using Intel Device View in Windows.

File menu

This contains one command, Exit which enables you to exit the Intel Device View. When a switch or stack is open and the configuration has been changed and not saved to the Flash Memory as the permanent configuration, you are asked if you want to save the new configuration before exiting.

Device menu

The Device menu contains the following switch commands:

- Install — enables you to install a new device, which does not have an IP address, in Intel Device View. Can also be accessed by selecting .
- Manage — enables a switch or stack that has an IP address already assigned to be managed or configured. Can also be accessed by selecting .
- Discover — enables you to set up how the Device Tree discovers devices and users.

  Note: do not leave the Subnet Mask blank or set to 0.0.0.0, as Intel Device View will continually broadcast device discovery messages to all networks and use bandwidth.

- A list of IP addresses — contains the last eight switches successfully contacted from Intel Device View. These can be used to manage the switch.

View menu — for Windows users only

The View menu allows you to customize the Intel Device View display to your own preferences: the Toolbar and Status Bar can be switched on and off.

Monitoring menu

This menu gives access to set the Default Preferences for Intel Device View, see “Setting the Preferences”, p. 24.

Tools menu

The Tools menu has the following commands:

- Ping — sends ICMP echo packets to the switch. Can also be accessed by selecting .
- A Report Manager — uploads reports, logs and the parameter block from the switch. Can also be accessed by selecting .
- A Recovery Manager — regains control of your switch if you have lost contact. This is described in “Recovery Manager”, p. 107.
- A DNS-IP conversion tool converts DNS names to IP addresses.

These are described in detail, together with switch specific tools, in the Chapter “Managing the Switch”, p. 79.

Help menu

The Help menu has the following commands for the switch:

- Help for Intel Device View. Can also be accessed by selecting the Help icon then clicking on the feature of interest
- Help for switch specific topics.

After a Switch or Stack is Contacted

Commands

When Intel Device View contacts a switch, the basic commands are supplemented with:

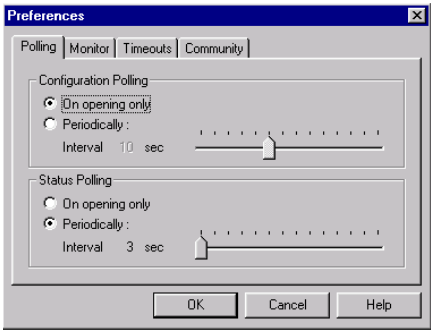
- Local Management access — provides Telnet access to monitoring functions embedded in the switch.
- RMON facility — gathers information about the network traffic, monitors traffic on subnets and enables you to define alarms on the individual ports.
- Stack Synchronization Manager (for stacks only) — enables you to establish a stack from a group of switches connected via a Matrix Module, or add a switch to an existing stack and then synchronize their configurations.
- Switch Position Organizer (for stacks only) — enables you to move the switches displayed on screen around in the stack.
- Color Code Matrix Ports (for stacks only) — colors the individual ports on the Matrix Module. This simplifies the task of tracing cables, as the ports on the Stack Interface Modules become the same color as the corresponding Matrix Module port.
- A color coding chart for Intel Device View to show the states of switch's LEDs

Setting the Preferences

Setting the polling intervals

The polling intervals determine how often Intel Device View contacts the switch or stack and updates the status and information displayed. To change the polling parameters:

1 Select `Monitoring>Preferences`.



2 Click `Polling` or `Monitor`.

3 If you want the polling to happen more frequently than just on opening, click `Periodically`.

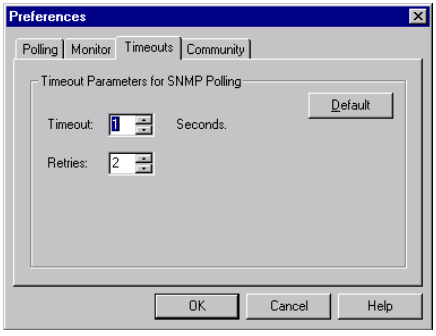
4 Move the `Interval` slider to the required time.

5 Click `OK`.

Setting the timeout parameters for SNMP

The timeout determines the intervals between polling and the number of times the request is retried if a device is not responding. To change the timeout parameters:

1. Select `Monitoring>Preferences`.
2. Click `Timeouts`.

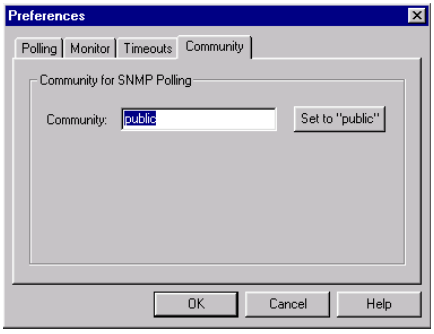


3. Change the values.
4. Click `OK`.

Setting the community for SNMP polling

The community for SNMP polling determines access rights. To change the community:

1. Select `Monitoring>Preferences`.
2. Click `Community`.



3. Type the new community name.
4. Click `OK`.

Installing and Managing Switches

Following installation of Intel Device View

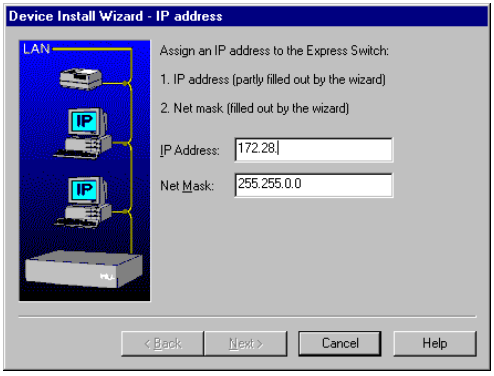
After installing Intel Device View, you can add new switches, establish or expand stacks of switches, and manage existing switches and stacks.

Adding new switches

To add new switches (that have not been assigned an IP address) to Intel Device View, select `Device>Install`. The Install Wizard will start and guide you through the installation.

The Install Wizard

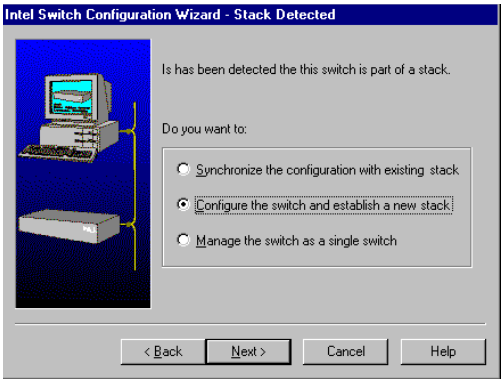
The Install Wizard requires that you enter a minimum amount of information to set up the switch for management by Intel Device View. To select the correct new device, you need to know the device's MAC address. You can find this on a label on the rear panel of the device. You must assign an IP address (and subnet mask) to the switch on your Local Area Network (LAN).



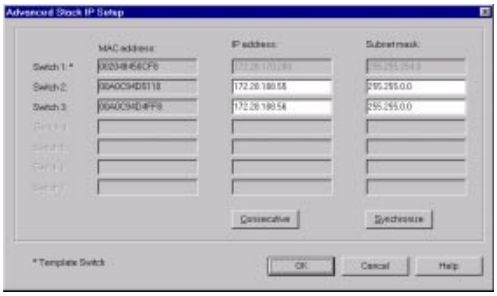
Intel Device View uses this address for configuration and management purposes.

Matrix Module connected to a new switch

When the Install wizard detects that a new switch is connected to a Matrix Module, a message informs that you must decide how to manage the switch.


Intel Switch Configuration Wizard - Stack Detected
Is has been detected the this switch is part of a stack.
Do you want to:
Synchronize the configuration with existing stack
Configure the switch and establish a new stack
Manage the switch as a single switch
< Back
Next >
Cancel
Help

If you want to manage it separately, the installation is completed and the switch is displayed in the Intel Device View window. If you want to manage it as part of a stack, you have the opportunity to assign consecutive IP addresses in the next dialog.



The Synchronization Wizard completes the installation. The complete stack, including the new switch, then appears in the Intel Device View window. The Synchronization wizard is described in detail in “Stack Synchronization Manager”, p. 108.

Managing an existing switch or stack

To manage a switch or stack that has an IP address already assigned:

1 Select `Device>Manage` The Manage dialog box appears.

2 Type in the switch’s IP Address or MAC address.

3 Select the box if you want to open the switch in a new Intel Device View window.

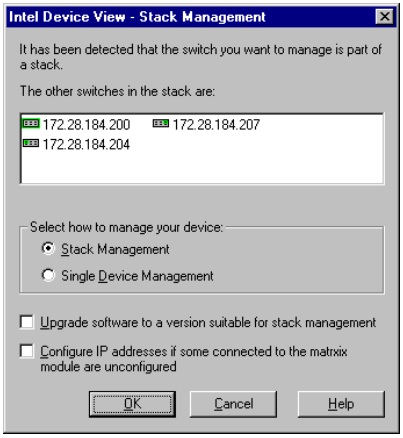
4 Click `OK`.

Establishing and expanding a stack

If you connect switches that already have IP addresses assigned together via a Matrix Module, you can manage them as a stack. To create or expand an existing stack:

1 Select `Device>Manage`, and the Manage dialog opens.

2 Type in the IP Address or MAC address of one of the switches. All the switches connected via the Matrix Module are displayed in this window, even switches that are already configured as a stack.


Intel Device View - Stack Management
It has been detected that the switch you want to manage is part of a stack.
The other switches in the stack are:
172.28.184.200
172.28.184.207
172.28.184.204
Select how to manage your device:
Stack Management
Single Device Management
Upgrade software to a version suitable for stack management
Configure IP addresses if some connected to the matrxix module are unconfigured
OK
Cancel
Help

3 If the switches don't have compatible software, the `Upgrade` box is checked. If one or more of the switches aren't configured, the Configure `IP address` box is check.

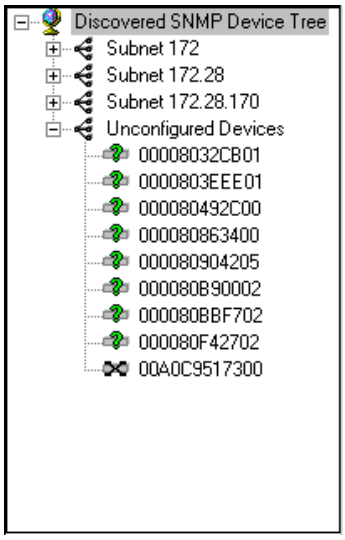
4 Select `Stack Management`.

5 Select `OK`. The Upgrade Wizard starts automatically if software needs to be upgraded.

Device Tree

Introduction

The Device Tree displays the separate subnets on your LAN as branches in a tree. This includes a branch that shows all the unconfigured devices on the LAN.



Identifying devices

The Device Tree uses several icons to represent the individual devices:

Icons	Device Description
	Recognized as a switch.
	Recognized as a router.
	Recognized as a hub.
	Device contacted, but not recognized.
	Lost contact with device.

Installing and managing switches

Double clicking the switch's IP address or MAC address opens existing switches in the Intel Device View window, or starts the Install Wizard for new switches.

Right mouse button commands

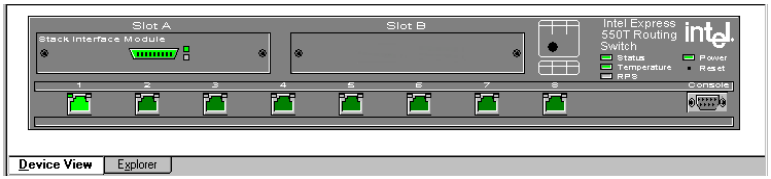
By positioning the mouse pointer in the Device Tree and clicking the right mouse button, the following functions are available:

Functions		Description
(without a device selected)		
View		
	IP Address	Sorts the devices by their IP addresses.
	Name	Sorts the devices by their DNS names.
Add Device		If a device has not been auto-detected then you can add it to the tree. You need to know its IP address.
Find		Locates a specific device by searching for its IP address.
Refresh		Polls the network and redisplays the tree. If a new device has been connected, it will appear after a refresh.
(additional functions with a device selected)		
Launch With		Opens the switch in Intel Device View.
Delete		Removes a device from the Device Tree.
Edit		Change the name, community settings (read and write) and polling rate of the device.
RMON		
	Statistics	Provides subnet management statistics.
	History	Lists monitored traffic on a subnet.
	Alarms	Enables activity alarms to be set.
	Logs	Sets events defined by Log, Trap or Log and Trap.

Device View (Main Display)

Switch contacted

When Intel Device View contacts the switch or stack, the front (interface side) of the switch or stack is displayed.



This view provides a real-time view of the switch, or stack and ports, which behave in the same way as the physical switch. For example, the LEDs change color according to the state of the switch/stack. You can fully manage the switch or stack using this display.

Mouse moves

Using a mouse makes it easier to operate Intel Device View and saves you time:

Mouse action	Information
Right-click switch	Shows the switch-related menus for configuration and monitoring.
Right-click stack border	Shows the stack-related menus for configuration and monitoring.
Right-click a port	Shows the port-related menus for configuration and monitoring.
Double left-click switch	Opens the Device Setup menu.
Double left-click a port	Opens that port’s Setup menu.

Right mouse button commands for a single switch

Right click a single switch and Intel Device View offers:

Functions	Description
Device Setup	Displays comprehensive information about the switch's overall setup.
VLAN/Routing Setup	Provides an overview of existing VLANs and the opportunity to add new ones or change existing ones.
IP Filtering Setup	Defines user groups and filter the packets sent to them.
Device Information	Informs you about the type of switch, its location, who is responsible for it and the amount of time passed since the switch was restarted.
Port Overview	Gives detailed monitoring information for each port.
Device Activity	Displays, in a graph format, information about the activity on the ports.
VLAN	Displays monitoring information and the status of the VLAN links.
IP Routing	Provides information about the IP routing links and networks, and the number of packets sent via the different IP protocols.
IPX Routing	Provides information about the IPX routing links and networks, and the number of packets sent via the IPX protocols.

Functions	Description
Device	Reboots the switch and provides information about the firmware in the switch. Also enables the switch's firmware to be upgraded.
Configuration	Ensures the switch's configuration is safe by saving it to the flash memory, by backing up to disk and by being able to restore it again should it be lost. If necessary, the switch can be returned to the factory default configuration.
Monitoring	Provides comprehensive details for Spanning Tree statistics and RMON facilities, as well as Hardware information and an Access Overview.

Right mouse button commands for a stack border

When managing a stack of switches, right click the stack border and Intel Device View offers:

Functions	Description
Stack Setup	Displays comprehensive information about the switch's overall setup.
VLAN/Routing Setup	Provides an overview of existing VLANs and the opportunity to add new ones or change existing ones.
IP Filtering Setup	Defines user groups and filters the packets sent to them.
Stack Health Monitor	Provides the IP addresses for all the switches in the stack, the type of switch and whether they are responding to ping.
IntraStack Traffic	Gives information about the traffic through the Matrix Module.
System Information	Gives the name and location of the stack, together with a contact name and the length of time the stack has been running.
Stack Activity	Displays as graphs monitoring information of traffic on the ports in the stack.

Functions	Description
Port Overview	Provides port performance, packet distribution and spanning tree information for all the ports in the stack.
Device	Enables you to reboot the stack and provides information about the firmware in the switches.
Configuration	Ensures the stack's configuration is safe by saving it to the flash memory, by backing up to disk and by being able to restore it again should it be lost. If necessary, the stack can be returned to the factory default configuration.
Monitoring	Provides Hardware information about the separate switches in the stacks and the access rights to the devices on the LAN.
Tools	Gives access to the Synchronization Manage, the Switch Position Organizer and Color Code Matrix Ports function.

Right mouse button commands for a switch in a stack

When managing a stack of switches, right click a switch and Intel Device View offers:

Functions	Description
IP and Name Setup	Displays the switch's IP address and Subnet mask.
Device Activity	Displays, in a graph format, information about the activity on the ports in the switch selected.
Spanning Tree	Provides statistics about the Spanning Tree on the selected switch.
VLAN	Displays monitoring information and the status of the VLAN links.
IP Routing	Provides information about the IP routing links and networks, and the number of packets sent via the different IP protocols.

Functions	Description
IPX Routing	Provides information about the IPX routing links and networks, and the number of packets sent via the IPX protocols.
Device	Restarts the switch and provides information about the firmware in the switch.
Configuration	Ensures the switch's configuration is safe by saving it to the flash memory.
Monitoring	Displays, as a graph, the activity on all the ports in the switch and RMON facilities.

Right mouse button commands for a port

Right click a single port and Intel Device View offers:

Functions	Description
Port Setup	Displays the port status, the speed and duplex settings, and spanning tree settings.
Add Port to VLAN	Adds the port to a VLAN.
Port Details	Displays comprehensive performance, distribution and spanning tree details.
Port Activity	Displays, as a graph, the activity on the port.
VLAN Port Monitoring	Provides details about the MAC and IP addresses on the VLANs.
RMON Statistics	Provides RMON statistics for the selected port.

Color coding

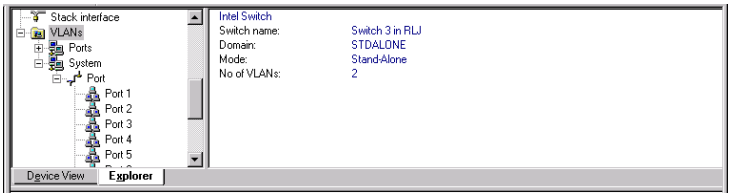
The switch and ports are displayed in different colors:

	Color	Means
Switch Body	Gray	The switch is operational (the software is loaded and running) and it can be contacted by Intel Device View via the network.
	Dark blue	That switch is selected, and various device-specific parameters can be changed using the right-mouse button.
Ports	Dark green	Port enabled, but no plug connected.
	Light green	Port enabled and plug connected.
	Brown	Port disabled by management or a hardware error.
	Dark blue	That port is selected, and various port-specific parameters can be changed using the right-mouse button.
	Purple	Port mirroring is enabled here.
Stack border	Dark blue	The stack is selected, and various stack-specific parameters can be changed using the right-mouse button.
Everything; switches, ports and stack border	Light blue	Intel Device View has lost contact with the devices (for example, the switch or your PC is disconnected from the LAN).

Explorer

Intel Device View Explorer

The Explorer within Intel Device View displays management information, for example VLANs on this switch and other switches.

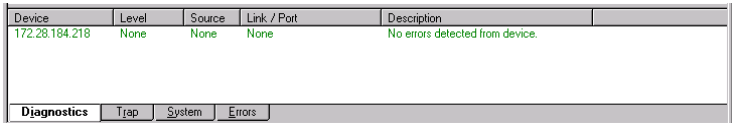


If a switch is disabled or not operational, it is displayed with a red cross through it.
General management information for the switch is accessed from the Monitoring menu.

Diagnostics Window

Intel Device View Diagnostics

The Diagnostics window helps you troubleshoot the switch/stack to get it working properly in case of problems.



The Diagnostics window lists any problems detected by the switch/stack and notes the level of the problem (fatal error, error or note) and the port on which the error occurred. Messages are automatically cleared from the list when the problem no longer exists

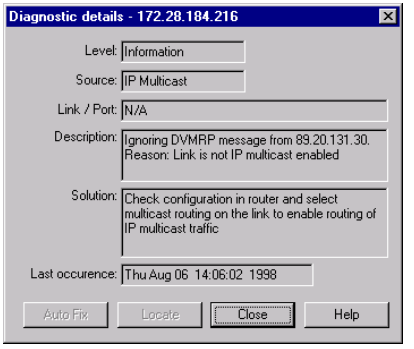
Right mouse button commands

Right click a message and Intel Device View offers:

Functions	Description
Details	Displays a diagnostic details window that describes the problem and gives a possible solution.
Refresh	Reloads and updates all the diagnostic information.
Clear	Clears all the messages displayed.
Use Color Coding	Displays the messages in different colors, depending on their severity.

Diagnostic details window

This window provides comprehensive details of the error.


Diagnostic details - 172.28.184.216
Level: Information
Source: IP Multicast
Link / Port: N/A
Description: Ignoring DVMRP message from 89.20.131.30. Reason: Link is not IP multicast enabled
Solution: Check configuration in router and select multicast routing on the link to enable routing of IP multicast traffic
Last occurence: Thu Aug 06 14:06:02 1998
Auto Fix
Locate
Close
Help

Trap Window

Traps window

The Traps window displays all traps generated by the switch.

Color coding

Traps are generated by the switch for many events, both normal and errors. Traps displayed in Intel Device View are color coded according to the severity of the trap.

Right mouse button commands

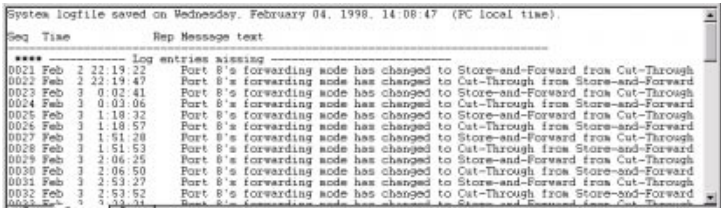
Right click a message and Intel Device View offers:

Functions	Description
Refresh	Reloads and updates all the information in this window.
Clear	Clears all the messages displayed.
Properties	Enables color coding to be switched on and off and define maximum number of messages displayed.

System Window

System window

The System window contains a log of all the major switch events with date and times (for example, return to factory default, filter entry settings, modules inserted in slots).


System logfile saved on Wednesday, February 04, 1998, 14:08:47 (PC local time)
Seq Time Rep Message text
**** ---------- Log entries missing ----------
0021 Feb 2 22:19:22 Port 8's forwarding mode has changed to Store-and-Forward from Cut-Through
0022 Feb 2 22:19:47 Port 8's forwarding mode has changed to Cut-Through from Store-and-Forward
0023 Feb 3 0:02:41 Port 8's forwarding mode has changed to Store-and-Forward from Cut-Through
0024 Feb 3 0:03:06 Port 8's forwarding mode has changed to Cut-Through from Store-and-Forward
0025 Feb 3 1:18:32 Port 8's forwarding mode has changed to Store-and-Forward from Cut-Through
0026 Feb 3 1:18:57 Port 8's forwarding mode has changed to Cut-Through from Store-and-Forward
0027 Feb 3 1:51:28 Port 8's forwarding mode has changed to Store-and-Forward from Cut-Through
0028 Feb 3 1:51:53 Port 8's forwarding mode has changed to Cut-Through from Store-and-Forward
0029 Feb 3 2:06:25 Port 8's forwarding mode has changed to Store-and-Forward from Cut-Through
0030 Feb 3 2:06:50 Port 8's forwarding mode has changed to Cut-Through from Store-and-Forward
0031 Feb 3 2:53:27 Port 8's forwarding mode has changed to Store-and-Forward from Cut-Through
0032 Feb 3 2:53:52 Port 8's forwarding mode has changed to Cut-Through from Store-and-Forward

Right mouse button commands

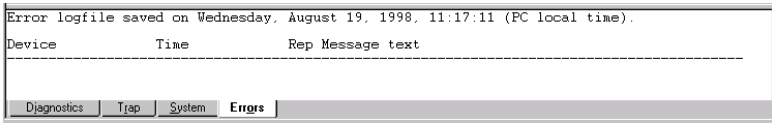
Right click a message and Intel Device View offers:

Functions	Description
Refresh	Reloads and updates all the information in this window.
Clear	Clears all the messages displayed.
Pause	Pauses the normal updating of information in this window.

Errors Window

Errors window

The Errors window is a log of all error messages generated by the switch.



Right mouse button commands

Right click a message and Intel Device View offers:

Functions	Description
Refresh	Reloads and updates all the information in this window.
Clear	Clears all the messages displayed.
Pause	Pauses the normal updating of information in this window.

3 Standard Configuration

In this chapter

Configuration is the way we change the setup of the switch or stack. In this chapter you will find all the instructions you need to change setups that affect the switch, or stack, and the ports.

Topic	See Page
Changing the Setup of the Switch or Stack	42
Changing the Setup of the Port	57

In chapter 4 you will find instructions to integrate VLANs and routing into your setup.

Changing the Setup of the Switch or Stack

Improving switch security

To restrict the use of the switch or stack, you can:

- Change the administrator password for local management.
- Change the user password for local management.
- Limit access to Local Management via the `Console` port and/or Telnet.
- Specify a time of “no input”, after which the connection with Local Management is terminated.
- Change the password for moving files with TFTP.
- Specify use of TFTP.
- Restrict access to include only the stations named on the Authentications list.

Using the mouse

There are two ways to access the `Device Setup` (for single switches) or `Stack Setup` window:

- Double-click the switch or the stack border.
- Right-click the switch or the stack border.

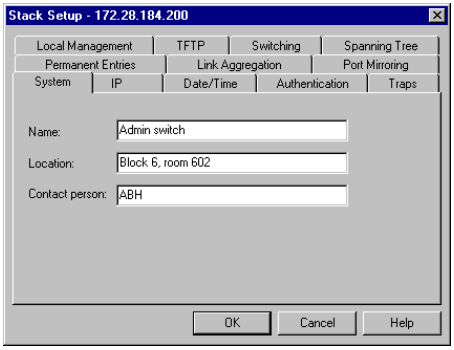
System

Identifying the switch

To assist with switch identification and administration, you can change certain switch details (name, location and contact person). With a switch or stack in the Device View window:

1 Select `Device Setup` or `Stack Setup`.

2 Click `System`.



3 Change the details.

4 Click `OK`.

These details are used by SNMP management centers.

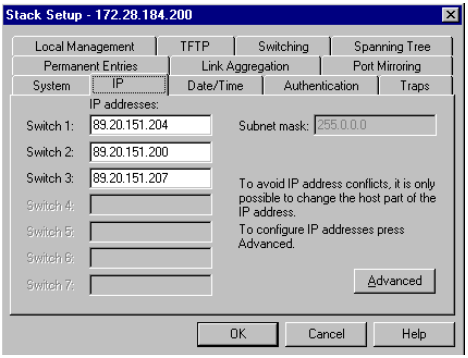
Internet Protocol

Changing IP details

To change the main IP address and network mask:

1 Select `Device Setup` or `Stack Setup`.

2 Click `IP`.



3 Change the details.

4 Click `OK`.

This is used to contact the switch via IP (TFTP, SNMP, TELNET etc.) protocols.

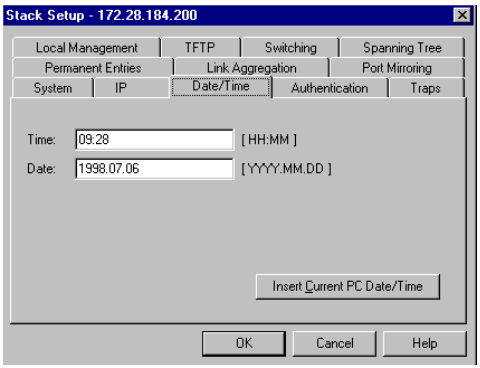
Local Time

Setting the date and clock to local time

To change the clock in the switch to your local time:

1 Select `Device Setup` or `Stack Setup`.

2 Click `Date/Time`.



3 Click `Insert Current PC Date/Time` to show the present settings. If this is satisfactory, click `OK`.

Note The clock displays the time at which it is accessed and not the current time.

4 If the time or the date is not satisfactory, click the date and/or time options and type the new time and date.

5 Click `OK`.

Authentication

Purpose

SNMP is a fully defined, interoperative standard that helps you manage both the switch and the network. To do this you can:

- Specify the names of the hosts to access the SNMP agent on the switch (authentication) by defining the source IP and community
- Specify read-write or read-only for authenticated hosts
- Request a trap to be sent if authentication is violated

Note If no hosts are defined in the Authentication List, any host can access the SNMP agent in the switch.

Security

The authentications list defines the hosts that can carry out SNMP, TFTP or Telnet management on the switch, have read-write or read-only rights and access to communities. You can:

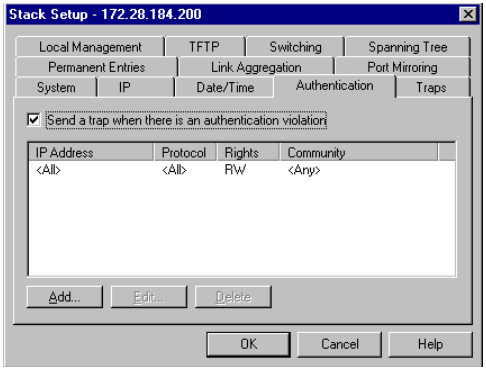
- Add a new entry to the list
- Delete an entry
- Edit existing entries

Adding a device

To add a host that is allowed to carry out management on the switch:

1 Select `Device Setup` or `Stack Setup`.

2 Click `Authentications`.



3 Click `Send trap when authentication violation`.

A message will be sent to the `Traps` window if unauthorized hosts try to carry out management on the switch.

4 Click `Add`.

5 In `IP address`, type the IP address of the device to manage the switch.

You can have a maximum of eight addresses in the list. The address 0.0.0.0 indicates that all IP addresses are accepted.

6 Click `Protocol` and select one.

7 Click `Rights` and specify the level of access to the switch

8 For SNMP only, click `Community` and type the SNMP request name accepted by the SNMP agent.

If no community name is specified, all community names are accepted by the SNMP agent.

9 Click OK.

Traps

Purpose

A trap alerts you of events occurring in the switch. The traps list shows where SNMP traps (generated by the switch) are sent. You can:

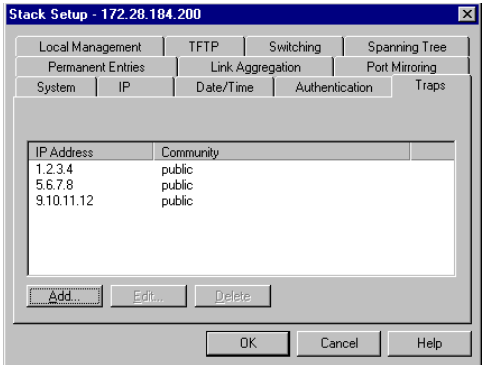
- Add a new entry to the list
- Delete an entry
- Edit existing entries

Adding a trap

Note If there are no entries in the Traps list, then no SNMP traps are sent.

1 Select Device Setup or Stack Setup.

2 Click Traps.



3 Click Add.

4 Type the Destination IP address, or click This PC.

5 Type the community (SNMP password).

6 Click OK.

Permanent Entries

Purpose

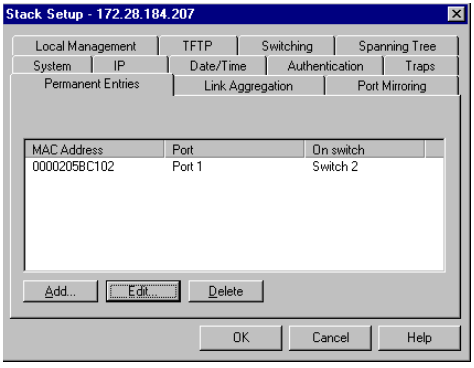
Enables you to allocate a port to a device that does not send out device information. These devices are not removed from the switch's address table, regardless of how long they are quiet. This is useful for connections to printers and other similar devices. You can:

- Add a new entry to the list
- Delete an entry
- Edit existing entries

Adding a Permanent Entry

To add a device to the switch's address table:

1. Select `Device Setup` or `Stack Setup`.
2. Click `Permanent Entries`.



3. Click `Add`.
4. Type the device's MAC address.
5. Click `Port number` and select one. A permanent entry is only made on the defined port.
6. Click `OK`.

Link Aggregation

Purpose

Combines two or four adjacent ports to increase the bandwidth between two switches or stacks. You can:

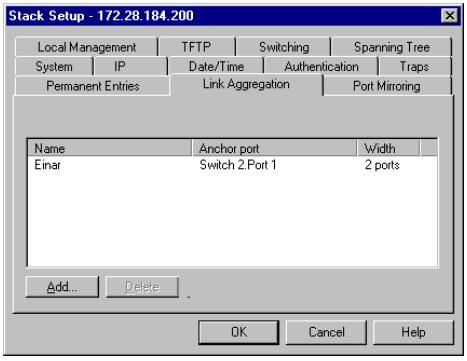
- Add a new entry to the list
- Delete an entry

Adding an Aggregate Link

To set up and add an aggregate link:

1 Select `Device Setup` or `Stack Setup`.

2 Click `Link Aggregation`.



3 Click `Add`.

4 For a stack, click `Switch` and select one from the list.

5 Click `Aggregation width:` and select `2 Ports` or `4 Ports`.

6 Click `Anchor Port` and select a port.

7 Type a unique name for the link.

8 Click `OK`. For further configuration of a link, for example in a VLAN, use the Anchor Port.

Port Mirroring

Purpose

Provides a facility to debug or monitor traffic on a specific port, by duplicating the traffic and sending it to a specified port. Only one pair of ports can be mirrored per switch. Within Port Mirroring, you can:

- Add a new entry to the list
- Delete an entry
- Edit existing entries

Important

When a switch has Port Mirroring enabled, the switch cannot collect RMON data from the RMON groups 4 to 8.

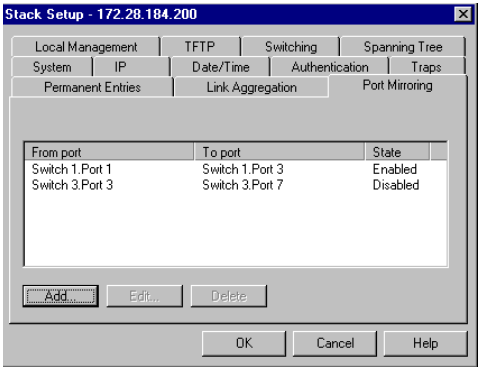
Adding Port Mirroring

To add a mirrored port to a switch:

Note If Port Mirroring is enabled, the source port will be in store-and-forward mode. Therefore, Runts, CRCs, etc. will not be forwarded or mirrored.

1 Select `Device Setup` or `Stack Setup`.

2 Click `Port Mirroring`.



3 Click `Add`.

4 For a stack, click `Switch` and select one.

5 Click `Reflect from` and select the port that you want.

6 Click `Reflect to` and select the port to where the traffic can be debugged/monitored.

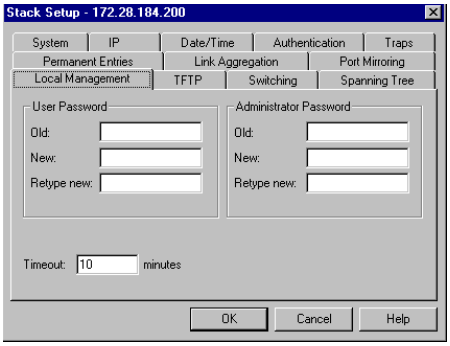
7 Click `OK`.

Local Management

Changing password details

The administrator has read-write access at all levels. The user can read the monitoring screens, but cannot change the configuration, update software or reset the station. To prevent unauthorized personnel changing configurations:

1. Select `Device Setup` or `Stack Setup`.
2. Click `Local Management`.



3. You can change the passwords for the Administrator and User.
4. Type the old password.
5. Type the new password.
6. Retype the new password (in `Retype new`).
7. Click `OK`.

Changing timeout details

When there has been no input during this period, the connection with Local Management is terminated. To change the timeout interval:

1. Select `Configuration>Device Setup`.
2. Click `Local Management`.
3. Type the new time.
4. Click `OK`.

TFTP

Changing password details

To give added security, you can limit the number of staff authorized to transfer TFTP files by changing the TFTP password. To change the password:

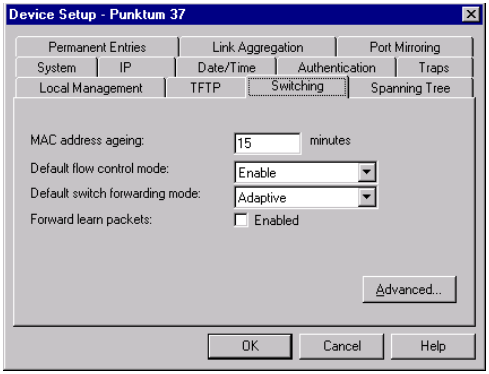
1. Select `Device Setup` or `Stack Setup`.
2. Click `TFTP`.
3. Type the old password.
4. Type the new password.
5. Retype the new password (in `Retype new`).
6. Select `OK`.

Switching

Changing the MAC address ageing time

To change the time a MAC address is kept in the filter before being purged:

1. Select `Device Setup` or `Stack Setup.`
2. Click `Switching`.



3. Click `MAC Address Ageing`.
4. Type the required number of minutes.
5. Click `OK`.

Changing the flow control

Flow control prevents the loss of frames during busy periods. Note that the individual port settings overrule the default setting. To change the default flow mechanism on all ports:

1. Select `Device Setup` or `Stack Setup`.
2. Click `Switching`.
3. Click `Default Flow Control`.
4. Click `Enabled` or `Disabled`.
5. Click `OK`.

Changing the default forwarding mode

To change the forwarding mode to be used on all ports:

1. Select `Device Setup` or `Stack Setup`.
2. Click `Switching`.
3. Click `Default Switch Forwarding Mode`.
4. Click the default forwarding mode you want.
5. Click `OK`.

Enable forward learn packets mode

When this mode is enabled, all packets are forwarded. However, if there is not enough memory in the switch, due to heavy load, the packet is discarded. When this mode is disabled, only “IPX Get server” request packets are forwarded. To enable or disable this mode:

1. Select `Device Setup` or `Stack Setup`.
2. Click `Switching`.
3. Check the box to enable this mode.
4. Click `OK`.

Adaptive Forwarding Mode

Purpose

You can:

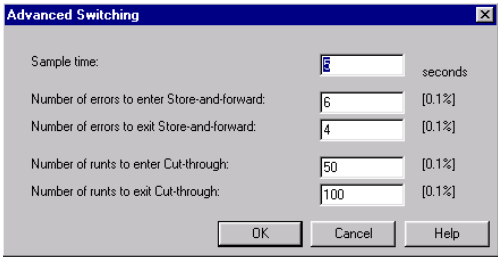
- Change the Sample Time
- Define the minimum and maximum errors acceptable before changing the forwarding mode

Note While CRC errors and runts are the most likely parameters to cause the switching mode to change, they are not the only ones.

Changing the time to measure errors

The sample time should be the shortest time needed to detect errors. If the sample time is too great, there may be too many errors before the forwarding mode changes. To change the time the switch retains error counters:

1. Select `Device Setup` or `Stack Setup`.
2. Click `Switching`.
3. Click `Advanced`.



4. Click `Sample Time`.
5. Type the required number of seconds.
6. Click `OK`.

Changing number of errors before adaptive forwarding mode operates

Adaptive forwarding changes the forwarding mode depending on the upper and lower limits of specific error types. To change the number of upper and lower limits:

1. Select `Device Setup` or `Stack Setup`.
2. Click `Switching`.
3. Click `Advanced`.

4 Click the required parameter.

5 Type the percentage of errors or runts.

6 Click OK.

Spanning Tree

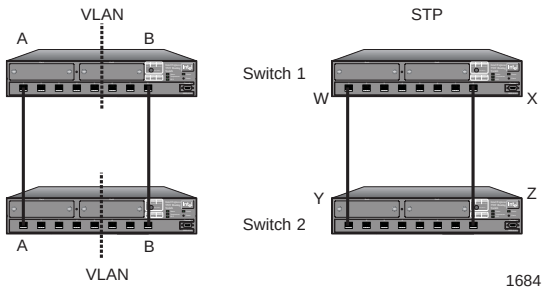
Purpose

You can change the:

- Priority given to the switch
- Maximum length of time information is retained by the switch
- Time between transmitted Configuration BPDUs
- Time the switch spends in the Listening and Learning states

Warning when using VLANs

It is important to be aware of problems that may arise when using Spanning Tree and VLANs. The Spanning Tree can use alternative paths (such as different ports) to get messages to their destination.



The diagram above, shows two switches. On the left, we see the two switches connected and the ports are grouped in two VLANs: A and B. On the right, we have enabled STP; STP blocks the path between X and Z (to avoid looping) and, therefore, destroys the VLAN setup (because VLAN B needs these ports to receive messages).

Why change these from their defaults?

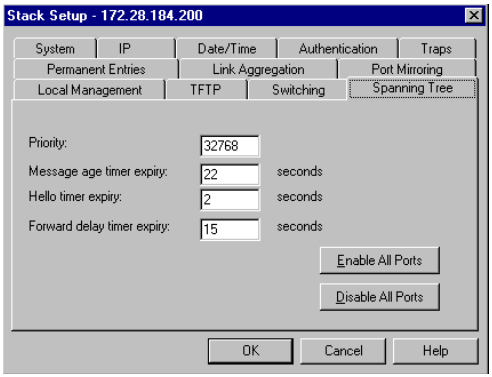
The switch is delivered with Spanning Tree default values set to those recommended by the IEEE 802.1d standard. These values are conservative worst-case estimates for LANs consisting of a large number of switches. Therefore, changing these default values may improve the performance of your network.

Changing the spanning tree priority

The higher the value, the lower the chance of the switch being used as the root bridge. To change the priority value:

1 Select `Device Setup` or `Stack Setup`.

2 Click `Spanning Tree`.



3 Click `Priority`.

4 Type the required value.

5 Click `OK`.

Changing the message age expiry time

To change the maximum time between protocol information being received and discarded:

1 Select `Device Setup` or `Stack Setup`.

2 Click `Spanning Tree`.

3 Click `Message Age Timer Expiry`.

4 Type the required number of seconds.

5 Click `OK`.

Changing the hello expiry time

To change the time between transmissions of configuration BPDUs from a switch that is, or attempting to become, the root:

1 Select `Device Setup` or `Stack Setup`.

2 Click `Spanning Tree`.

3 Click `Hello Timer Expiry`.

4 Type the required number of seconds.

5 Click `OK`.

Changing the forward delay expiry time

To change the time between port states while the bridge attempts to become the root:

1 Select `Device Setup` or `Stack Setup`.

2 Click `Spanning Tree`.

3 Click `Forward Delay Timer Expiry`.

4 Type the required number of seconds.

5 Click `OK`.

Changing the state of the ports

To specify that all ports are using Spanning Tree Protocol:

1 Select `Device Setup` or `Stack Setup`.

2 Click `Spanning Tree`.

3 Click `Enable All Ports`.

The ports are able to resolve problematic network loops using STP.

4 Click `OK`.

Changing the Setup of the Port

Purpose

You can configure the port to operate in different ways, according to your network's requirements:

- Change the port state
- Select the auto-negotiation mode
- Change each port to half or full duplex

  (If auto-negotiation is not enabled)
- Specify the speed of the port

  (If auto-negotiation is not enabled)
- Change the forwarding mode of the port
- Change the flow control setting of the port

- Specify the spanning tree

Using the mouse

There are two ways to access the Port Setup window:

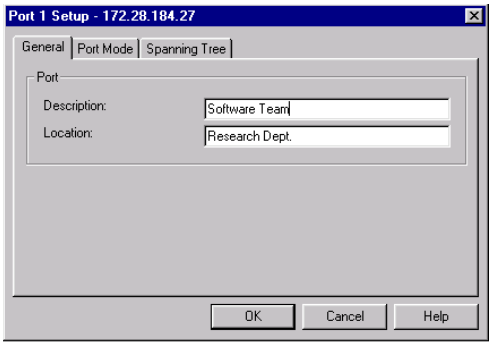
- Double-click the port
- Right-click on the port, and click `Port Setup`

General Changes

Renaming a port

To give a port a new name, for example, its use or the user(s) connected:

1. Click the port you want to rename.
2. Select `Port Setup`.
3. Click `General`.



4. In `Description`, type the new name.
5. Click `OK`.

Location for a port

To specify the location (for example, an office number or department) of the device attached to a port:

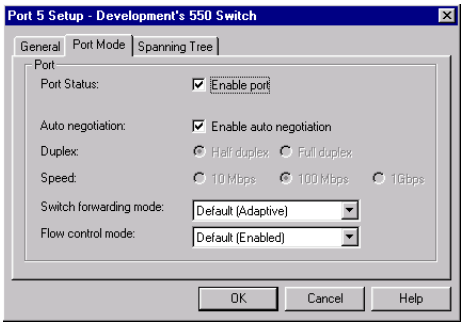
1. Click the port you want to give a home to.
2. Select `Port Setup`.
3. Click `General`.
4. In `Location`, type where the device is.
5. Click `OK`.

Port Mode

Disabling the port

If you disable the port, the devices attached to it cannot use the switch. The MAC address of those devices are removed from the switch's address table. If those addresses are defined as permanent entries, they are not purged but are unable to use the switch. To disable the port:

1. Click the port you want to disable.
2. Select `Port Setup`.
3. Click `Port Mode`.



4. Click `Enable Port`.

   If there is a check mark in the box, the port is operational. If the box is empty, the port is disabled.

5. Click `OK`.

Disabling auto-negotiation

To disable auto-negotiation, and reset the speed to the values specified in `Speed`:

1. Click the port you want to disable auto-negotiation.
2. Select `Port Setup`.
3. Click `Port Mode`.
4. Click `Enable Auto-negotiation`.

   If there is a check mark in the box, the port automatically detects the line-speed and duplex setting. If the box is empty, auto-negotiation is disabled and the port uses the values specified in `Duplex` and `Speed`.

5 Click `OK`.

Changing duplex mode

To change the port's duplex mode (when auto-negotiation is disabled):

1 Click the port you want to change.

2 Select `Port Setup`.

3 Click `Port Mode`.

4 Click `Half Duplex` or `Full Duplex`.

`Half` allows either transmission or receipt of the data and `Full` allows both transmission and receipt of the data.

5 Click `OK`.

Changing the port speed

To change the speed a port accepts data (when auto-negotiation is disabled):

1 Click the port you want to change.

2 Select `Port Setup`.

3 Click `Port Mode`.

4 Click `Speed 10` or `Speed 100`.

`10` limits data entering to 10Mbps and `100` allows data speeds up to 100Mbps.

5 Click `OK`.

Changing the forwarding mode on a port

To change the forwarding mode to be used on a port:

1 Click the port you want to change.

2 Select `Port Setup`.

3 Click `Port Mode`.

4 In `Switch Forwarding Mode`, click the forwarding mode you want.

`Default` uses the same forwarding mode as specified in `Device Setup`.

5 Click `OK`.

Changing the flow control on a port

Flow control prevents the loss of frames during busy periods. To change the flow mechanism on a port:

Note This feature is over-ridden by disabling the flow control setting in `Device Setup>Switching`.

1. Click the port you want to change.
2. Select `Port Setup`.
3. Click `Port Mode`.
4. In `Flow Control`, click the flow control you want.

   `Default` uses the same flow control as specified in `Device Setup.`
5. Click `OK`.

Port Specific Spanning Tree

Purpose

You can:

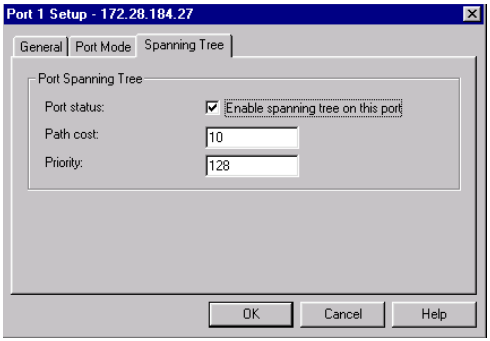
- View the Spanning Tree setups for the port
- Specify whether STP (Spanning Tree Protocol) is enabled on the port
- Define which ports are going to be used most frequently

Changing the state of a port

To specify that a port is using STP:

1. Click the port you want to change.
2. Select `Port Setup`.

3 Click `Spanning Tree`.



4 Click `Enable spanning tree on this port`.

If there is a check mark in the box, the port is used in STP. If the box is empty, the port is not used in STP.

5 Click `OK`.

Changing the cost of the path

The higher the cost, the lower the chance of this port being used for forwarding traffic, if there is an alternative route. When possible, give a port a low cost if it is connected to a faster network segment. To change the overall cost of the path between a port and the segment:

1 Click the port you want to change.

2 Select `Port Setup`.

3 Click `Spanning Tree`.

4 Select the `Port status` box.

5 In `Path cost`, type the required value.

6 Click `OK`.

Changing priority of the port in the spanning tree

The higher the value, the lower the chance of this port being used as the designated or root port. To change the priority value:

1 Click the port you want to change.

2 Select `Port Setup`.

3 Click `Spanning Tree`.

4 Select the `Port status` box.

5 In `Priority`, type the required value.

If there are two ports with the same value, the port with the lowest port number is chosen.

6 Click `OK`.

4 Advanced Configuration

In this chapter

In this chapter you will learn how to use Advanced Configuration effectively. This chapter covers the Virtual LAN (VLAN), Routing and IP Filtering features.

You can create logical network groups (VLANs) by segmenting the switch; for example, according to the subnetting scheme within your network. Each VLAN is an isolated group and the switch only forwards traffic between members of the same group. Communication between groups can be implemented using routers.

Routing can be implemented using an external router or the internal routing feature. The switch can run either stand-alone or distributed VLANs. For single switches using stand-alone VLANs, the local configuration (for example, ports) must be configured on each switch. This does not apply to a stack. For distributed VLANs, the global configuration of MAC and IP addresses is automatically distributed. Local policies are distributed within a stack, regardless of the VLAN mode.

IP Filtering enables selective filtering of data traffic. It is available when you are routing between nets or VLANs. It enables you to send data packets to specific workstations or user groups across the VLANs.

Note This switch is able to forward tagged frames from devices supporting IEEE 802.1p/Q. These frames are only forwarded to ports that are in the same VLAN.

However, IP policies cannot be used for devices using tagged VLANs and IP learning is not possible. In addition to this, tagged frames cannot be routed between VLANs.

VLANs (Virtual LANs)

Purpose

You can use VLANs to:

- Create up to 128 separate user groups
- Limit broadcast and multicast traffic
- Increase security by limiting communication between groups
- Allocate network resources (such as servers) to groups

For a more comprehensive explanation of the VLAN concept, refer to the online help.

Warning when using STP

It is important to be aware of problems that may arise when using Spanning Tree and VLANs. The Spanning Tree can use alternative paths (such as different ports) to get messages to their destination. VLANs specify which ports can receive messages (see “Spanning Tree”, p. 55).

Warning When using the Spanning Tree facility, use only one VLAN. If you use two or more VLANs, unexpected changes in your network topology may occur.

Policy-based VLANs

The switch or stack uses “Policy-based VLANs”. This means that the devices attached to the switch/stack can be grouped by any combination of MAC address, IP address, IP net and port number; therefore, devices can belong to one or more VLANs.

Policy hierarchy

To avoid conflicts between two VLANs, a strict priority of the policies is used:

1. MAC address
2. IP address and IP net

3. Port

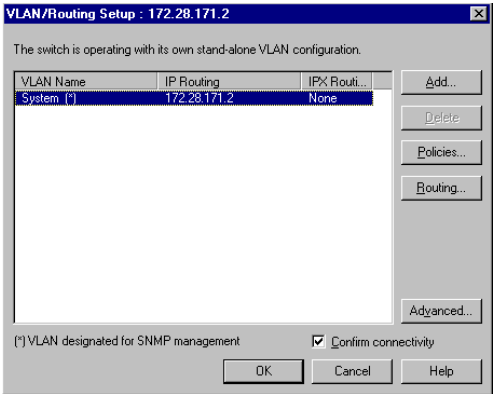
Warning This means that a station learned by a MAC rule is not learned by an IP or Port rule, and a station learned by an IP rule is not learned by a Port rule. Only stations that are not learned by MAC or IP rules are learned by a Port rule.

Note IP policies can be used only when IP learning is enabled on the respective ports.

Adding a VLAN

The task of adding VLANs is simplified by using the `VLAN Wizard`. VLANs are not switch specific when managing a stack. Therefore, right-click the stack border to access VLAN/Routing Setup. To add a VLAN:

1 Select `VLAN/Routing Setup`.



2 Click `Add`, and follow the instructions in the Wizard windows.

Policy	Information required
Switch Ports	Port numbers
IP Subnet	IP Subnet and Mask
Mixed policy	IP Subnet and Mask, Port numbers, MAC address and/or IP address
IP routing	Subnet and router link

Deleting a VLAN

To delete a VLAN:

1. Select `VLAN/Routing Setup`.
2. Click the name of the VLAN you want to delete. (Note: you cannot delete a VLAN if it is the `[Designated Management VLAN]`. To do this, click another VLAN, click `Properties` and then click `Use this VLAN for SNMP management`; you can now delete the first VLAN.)
3. Click `Delete`.

Adding a policy to a VLAN

You may want to add another policy (that is, a port, IP address, IP subnet or MAC address) to an existing VLAN. To add a policy:

1. Select `VLAN/Routing Setup`.
2. Click the name of the VLAN you want to edit.
3. Select `Policies>Add`.
4. Select the `New policy` type.
5. Fill in the appropriate field(s).
6. Click `Close`.

Adding a new switch to a distributed VLAN

If Intel Device View is connected to an existing switch, the new switch needs to be learned by the management VLAN before Intel Device View can access it.

We recommend that you connect Intel Device View directly to the new switch, or use a port-policy rule to learn it.

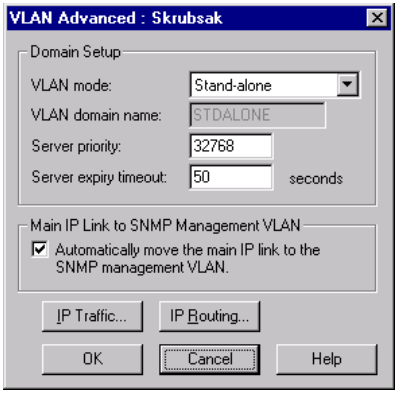
If you do not add the port on which the new switch is connected (using the port-policy rule), you must add the MAC address for the new switch instead.

For example, if you define the membership of a VLAN using a MAC policy, you need to use two MAC addresses. If the System MAC address is 00A0C9xxxxxx, you must enter 00A0C9xxxxxx and 02A0C9xxxxxx in the MAC policy.

Changing VLAN mode

To change the mode of operation of a VLAN:

1. Select `VLAN/Routing Setup`.
2. Click `Advanced`. The VLAN mode is shown.



3. Click the VLAN mode to see the full range of choices.

VLAN Mode	Description
Stand-alone	For single switches: there is no exchange of information with VLANs on other switches; each switch is its own domain (STDALONE).
	For switches in a stack: there is an exchange of information using VLANs between the switches in the stack; these switches are in their own domain (STDALONE).
Distributed	A domain is a collection of switches and can contain up to 128 VLANs. If you select distributed, each switch will be able to communicate with all the others in this domain.

4. Click the new mode and make sure the rest of the details are correct.
5. Click `OK`.

   Your switch may turn blue (for a few seconds) while the network stability returns; this is normal.

Adding a station to a Switch VLAN Link

To place a station on the link between two switches or two stacks, configure the station as a permanent entry. If you have a stack, right-click a stack border and select Stack Setup instead of Device Setup:

1. Choose one of the switches, and select `Device Setup>Permanent Entries>Add` in Intel Device View.
2. Enter the MAC address.
3. Select the number of the port to which the link is connected.
4. Make a MAC address policy in the VLANs to which this station is joining.

Changing VLAN domain name

This is relevant only for a Distributed VLAN. To change the domain name for all VLANs:

1. Select `VLAN/Routing Setup`.
2. Click `Advanced` The VLAN mode is highlighted.
3. Double-click the `VLAN Domain Name`, and type the new domain name (note that domain names are case sensitive).
4. Click `OK`.

Changing the priority of the server

This is relevant only for a Distributed VLAN. You can specify a switch in the domain to be the VLAN database server. The switch with the lowest value will be the server. To change the priority:

1. Select `VLAN/Routing Setup`.
2. Click `Advanced.` The VLAN mode is highlighted.
3. Double-click the `Server priority`, and type the new value.

   If two switches have the same priority, the switch with the lowest MAC address will be the server.
4. Click `OK`.

Changing the time before the server is removed

This is relevant only for a Distributed VLAN. After receiving a packet from the server, the switch/stack waits for a specific length of time before it assumes the server is lost. The switch/stack then starts to listen for a new server and, if none is found, it becomes the server. To change the length of time before the server is assumed to be lost:

1. Select `VLAN/Routing Setup`.
2. Click `Advanced`. The VLAN mode is highlighted.

3 Double-click `Server Expiry Time-out`, and type the new value.

4 Click `OK`.

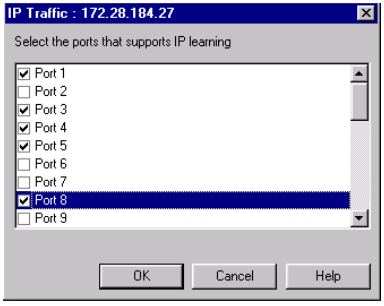
Ports with IP learning

IP learning must be enabled when using IP policies. (IP learning is enabled on all ports by default.) If you want to change the settings for individual ports, for example if you are using protocols other that IP protocols and don't want these stations to be learned using IP rules, you should:

1 Select `VLAN/Routing Setup`.

2 Click `Advanced`.

3 Click `IP Traffic` to specify which ports support IP learning.



4 Click `OK`.

Routing Between VLANs

Introduction

After you have created the VLAN groups, you can move (or route) packets of data between VLANs using the IP and IPX protocols.

Adding a routing link

To add a routing link to a VLAN that is not already configured:

1 Select `VLAN/Routing Setup>Add`.

Add VLAN
Welcome to the Virtual LAN (VLAN) Wizard for Intel Device View -- the easy way to to setup VLANs on your Intel Ethernet Switch.
VLANs allow you to isolate groups of devices connected to the switch for security, network trafficing and administrative purposes.
Devices can be members of one or more VLANs.
Network devices can be grouped in VLANs using:
The switch port that devices are connected to
The IP subnet number of devices
Any combination of MAC addresses, IP addresses/subnets and/or switch ports
Or
Setup an IP routing interface. This will automatically create a IP subnet based VLAN.
< Back
Next >
Cancel
Help

2 Select the `Setup an IP routing interface` box.

3 Click `Next`, and follow the instructions in the Wizard windows.

Changing IP and IPX details

To change the routing protocol details for an existing VLAN:

1 Select `VLAN/Routing Setup`.

2 Click `Routing`.

3 Select the `Use IP routing` or `Use IPX routing` box to make active (if possible).

4 Double-click the required field, type the new value and select the correct protocol parameters.

5 Click `OK`.

Adding a static route

A static route is a permanent entry in the routing table and is a path to IP network which is not announced by the RIP. A static route is announced to other switches or stacks using RIP. To add a static route:

1 Select `VLAN/Routing Setup`.

2 Click `Advanced>IP Routing`

3 Click `Add`

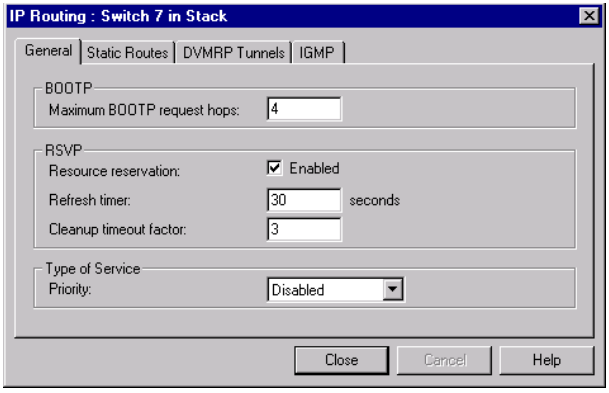
4 Double-click the required field, and type the new value.

5 Click `OK`.

Changing the number of BOOTP request hops

This parameter specifies the maximum number of hops that a BOOTP request can make before being discarded. To change the number of hops:

1. Select `VLAN/Routing Setup`.
2. Click `Advanced>IP Routing`.



3. Double-click the `Maximum BootP request hops`, and type the new value.
4. Click `OK`.

Changing RSVP settings

This ReSerVation Protocol (RSVP) facility allows bandwidth to be reserved, enabling guaranteed delivery of data. To change the settings:

1. Select `VLAN/Routing Setup`.
2. Click `Advanced>IP Routing.`
3. Click box to enable/disable RSVP, set Refresh Timer period and Cleanup timeout factor.
4. Click `OK`.

Changing Type of Service priorities

This uses IP packet preference settings to prioritize traffic through the switch. Packets with a higher setting are handled in preference to packets with lower settings. To change the priority level:

1. Select `VLAN/Routing Setup`.
2. Click `Advanced>IP Routing`.
3. Double-click the `ToS`, and type the new value (range 1-7).

4 Click OK.

DVMRP Tunnels

Introduction

This routing switch supports the Distance Vector Multicast Routing Protocol (DVMRP). This enables IP multicast packets to be encapsulated in an IP header, and sent through a tunnel between two specific switches on a network that does not support DVMRP routing. The tunnel is defined using IP addresses, a source IP address and a destination IP address.

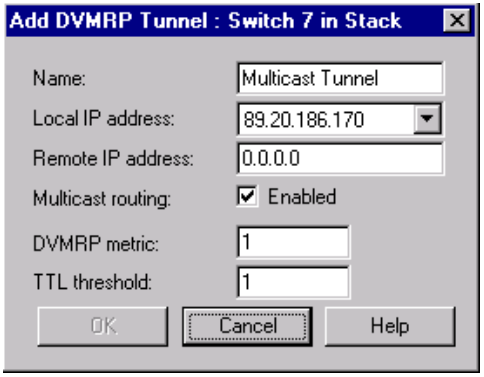
Adding a tunnel

A DVMRP tunnel must be set up in both switches over the tunnel.

1 Select `VLAN/Routing Setup`.

2 Click `Advanced>IP Routing>DVMRP Tunnels`.

3 Click `Add`.



4 Type the required information in the fields provided.

5 Click OK.

IP Multicast (IGMP pruning)

Warning when using pruning

It is important to be aware of problems that may arise when using IGMP pruning and IP Multicast addresses.

Warning When using the IGMP pruning, IP multicast packets not based on IGMP are discarded.

IGMP pruning can only be used in VLANs that have an IP link. Enabling IGMP pruning stops Layer 2 forwarding of IP multicast packets in all other VLANs without IP links.

Only enable IGMP pruning (on this device) when it is connected between the device receiving the packets and an IP multicast routing device. Or, disable IGMP pruning (on this device) when it is connected between the device transmitting the packets and an IP multicast routing device.

IP multicast routing in a stack

When enabling IP multicast routing on the management VLAN in a stack, you MUST assign the IP addresses consecutively to the management VLAN, for example, x.x.x.77, x.x.x.78, x.x.x.79 etc.

Enabling IGMP pruning

IGMP pruning implements a system where only the necessary amount of IP multicast packets are bridged. To enable IGMP pruning:

1. Select `VLAN/Routing Setup`.
2. Click `Advanced>IP Routing>IGMP`.
3. Check `Enabled`.
4. In `Pruning timeout`, type the new value.
5. Click `OK`.

IP Filtering

Purpose

IP filtering is available when you are routing between nets or VLANs. It enables you to send data packets to specific workstations or user groups across the VLANs. You define the members in these user groups and the type of IP filtering. IP filtering uses either IP addresses or specified IP protocols. It is specific for the individual switches, and therefore, right-click the switch to access the IP filtering functions.

Before you start

Look at the architecture of your network before starting. Make a list of proposed user groups and their filter parameters. Then look at the individual members to be included in the groups. This prevents workstations or subnets from being excluded when IP filtering is enabled.

Enabling IP Filtering

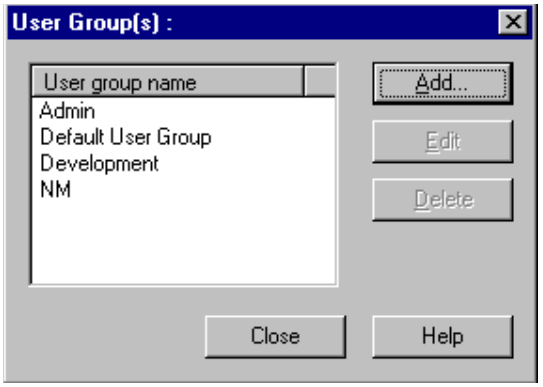
IP Filtering is enabled by default. There are two default user groups, which allow all traffic to pass. Enable is a toggle function, which also allows you to disable IP Filtering:

1. Select `IP Filtering Setup`.
2. Select `Enabled`.
3. Set up any User Groups and Members required.
4. Click `OK`.

Adding a User Group

Before filtering can take place, you must define the different user groups. To add a user group:

1. Select `IP Filtering Setup>User Groups`.



2. Click `Add`.
3. Type a unique name for the User Group.
4. Click `OK`.
5. When the User Group list is complete, click `Close`.

Adding a Member

To add a member to a user group:

1 Select `IP Filtering Setup>Add member`.

2 In `Type`, select whether the member is defined by Port (Protocol) or by Address.

3 For port selections, define the IP filter protocol, while for Address define the IP Address (and subnet if necessary).

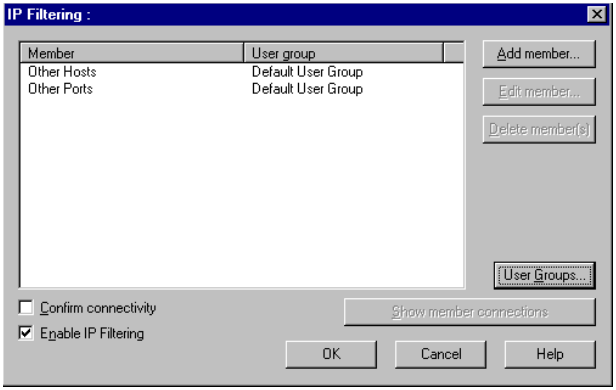
4 Select the User Group for this new member.

5 Click `OK`.

Checking Member connections

This checks which members a specific member can communicate with, and lists them on screen. To check connections:

1 Select `IP Filtering Setup`.



2. Click a Member in the list.
3. Click `Show member connections`
4. Verify that the connections for this member are correct.
5. Click `Close`.

5 Managing the Switch

In this chapter

This chapter covers the following topics.

Topic	See Page
Management using Intel Device View	80
Monitoring the Switch’s Performance	81
Monitoring the Stack’s Performance	86
Monitoring VLANs and Routing	91
Monitoring the Port’s Performance	99
Tools for the Switch	103
Tools for the Stack	108

Management using Intel Device View

Why use Intel Device View?

Intel Device View allows you to:

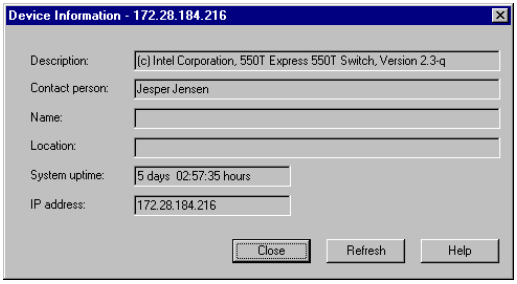
- Configure system, switching, IP, spanning tree, authentication, and trap parameters for the switch.
- Configure port-related parameters.
- View traps, logs, traces, and reports generated by the switch.
- Monitor port activity.
- Monitor port faults.
- Monitor switch activity.
- Monitor VLANs and Routing.

Information about the Switch

Identifying the switch

To see the name of the switch, the IP address, the administrator's name and how long the switch has been running:

1 Select `Device Information`.

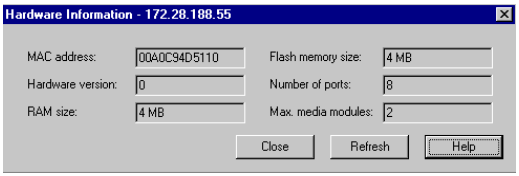


2 To update the information, click `Refresh`.

Hardware details

To see the MAC address, hardware version and memory size:

1 Click `Monitoring>Hardware Information`.



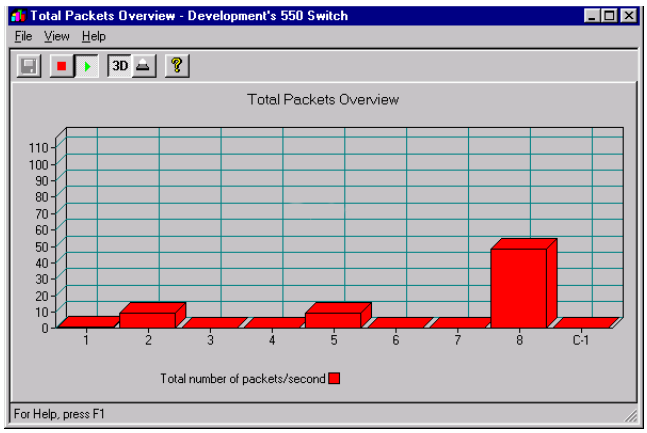
2 To update the information, click `Refresh`.

Monitoring the Switch's Performance

Monitoring the total packet activity

To view the total activity of the packets on all the ports:

1 Select `Device Activity>Total Packets`.



Each column represents a port and its activity level.

2 To see the exact value, hold the mouse pointer over a port.

3 Click `View` and change the presentation style: 3D- to 2D-Graph, with or without a peak value indicator and vertical to horizontal bars.

Monitoring the total activity of transmitted packets

To view the total activity of the packets being transmitted on all the ports:

1. Select `Device Activity>Tx Packets`.
   Each column represents the activity level on that port.
2. To see the exact value, hold the mouse pointer over a port.
3. Click `View` and change the presentation style: 3D- to 2D-Graph, with or without a peak value indicator and vertical to horizontal bars.

Monitoring the total activity of received packets

To view the total activity of the packets being received on all the ports:

1. Select `Device Activity>Rx Packets`.
   Each column represents the activity level on that port.
2. To see the exact value, hold the mouse pointer over a port.
3. Click `View` and change the presentation style: 3D- to 2D-Graph, with or without a peak value indicator and vertical to horizontal bars.

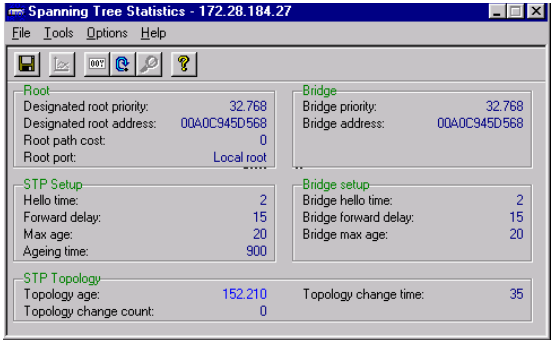
Monitoring the total number of errors

To view the total error activity of the packets on all the ports:

1. Select `Device Activity>Errors`.
   Each column represents the activity level on that port.
2. To see the exact value, hold the mouse pointer over a port.
3. Click `View` and change the presentation style: 3D- to 2D-Graph, with or without a peak value indicator and vertical to horizontal bars.

Monitoring the spanning tree statistics

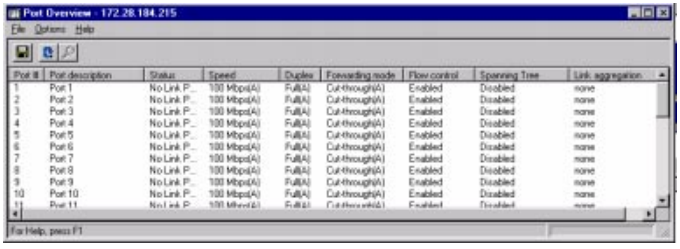
To view the spanning tree statistics for the whole switch, select `Spanning Tree Statistics`.



Overview of all the ports

To view the setups of all the ports on the switch:

1 Select `Port Overview`.

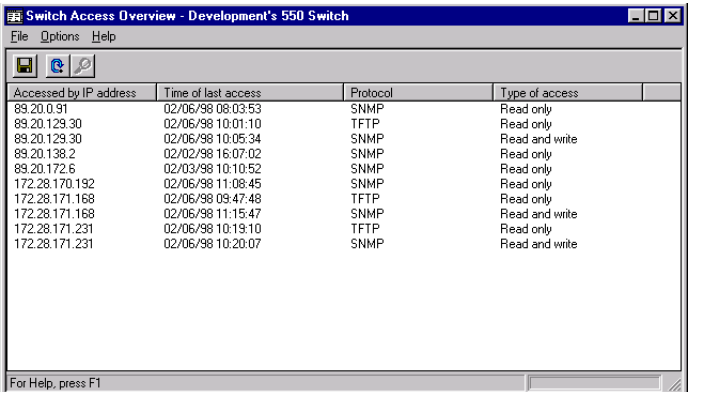

Port Overview - 172.28.184.215
File Options Help
Port # | Port description | Status | Speed | Duplex | Forwarding mode | Flow control | Spanning Tree | Link aggregation
1 Port 1 No Link P... 100 Mbps(A) Full(A) Cut-through(A) Enabled Disabled none
2 Port 2 No Link P... 100 Mbps(A) Full(A) Cut-through(A) Enabled Disabled none
3 Port 3 No Link P... 100 Mbps(A) Full(A) Cut-through(A) Enabled Disabled none
4 Port 4 No Link P... 100 Mbps(A) Full(A) Cut-through(A) Enabled Disabled none
5 Port 5 No Link P... 100 Mbps(A) Full(A) Cut-through(A) Enabled Disabled none
6 Port 6 No Link P... 100 Mbps(A) Full(A) Cut-through(A) Enabled Disabled none
7 Port 7 No Link P... 100 Mbps(A) Full(A) Cut-through(A) Enabled Disabled none
8 Port 8 No Link P... 100 Mbps(A) Full(A) Cut-through(A) Enabled Disabled none
9 Port 9 No Link P... 100 Mbps(A) Full(A) Cut-through(A) Enabled Disabled none
10 Port 10 No Link P... 100 Mbps(A) Full(A) Cut-through(A) Enabled Disabled none
For Help, press F1

2 Double-click a port to get the specific details for that port: port performance, faults, packet distribution, link aggregation and spanning tree information.

Stations on the switch

To view the IP addresses of the devices that have accessed management on the switch:

1 Click `Monitoring>Access Overview`.


Switch Access Overview - Development's 550 Switch
File Options Help
Accessed by IP address | Time of last access | Protocol | Type of access
89.20.0.91 | 02/06/98 08:03:53 | SNMP | Read only
89.20.129.30 | 02/06/98 10:01:10 | TFTP | Read only
89.20.129.30 | 02/06/98 10:05:34 | SNMP | Read and write
89.20.138.2 | 02/02/98 16:07:02 | SNMP | Read only
89.20.172.6 | 02/03/98 10:10:52 | SNMP | Read only
172.28.170.192 | 02/06/98 11:08:45 | SNMP | Read only
172.28.171.168 | 02/06/98 09:47:48 | TFTP | Read only
172.28.171.168 | 02/06/98 11:15:47 | SNMP | Read and write
172.28.171.231 | 02/06/98 10:19:10 | TFTP | Read only
172.28.171.231 | 02/06/98 10:20:07 | SNMP | Read and write
For Help, press F1

2 To change the order of the information, click the appropriate title bar.

Monitoring using RMON

Purpose

The switch contains several RMON functions. These function provide a tool for collecting information about network traffic. The following information, History, Alarm and Event Log are switch specific. Right-click the switch to access the relevant RMON facility.

RMON History

To monitor traffic on a subnet over a period of time:

1 Right-click a switch and select `Monitoring>RMON History.` This opens a window listing all history collections.

2 To open a graph showing the statistics, select a history and press `View`.

RMON Alarms

Alarm is a useful RMON feature; it enables you to set your own thresholds for when the network activity requires some attention.

1. Right-click a switch and select `Monitoring>RMON Alarms>Configure`. The `Alarm Table` window opens, which lists all alarms.
2. Click `Add` to add an alarm to the list.

   After defining the alarm, a trap is sent every time the threshold is exceeded.

RMON Events

Event is a useful RMON feature; it enables you to set your own events, defined by type; Log, Trap or Log and Trap:

1. Right-click a switch and select `Monitoring> RMON Alarms>Events`. The `Events Table` window opens, which lists all events defined.
2. Click `Add` to add an event to the list.

   Note Events can be created automatically through the alarm configurations.

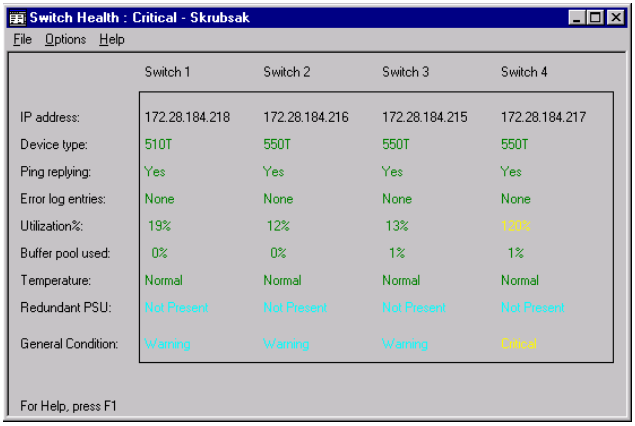
Online Help

For more information about the use of the RMON facilities, please refer to the online `Help`.

Monitoring the Stack's Performance

Monitoring the health of the stack

The Stack Health Monitor provides an overall status for the switches in the stack. To view the health of the stack: Right-click the stack border and select `Stack Health Monitor`.

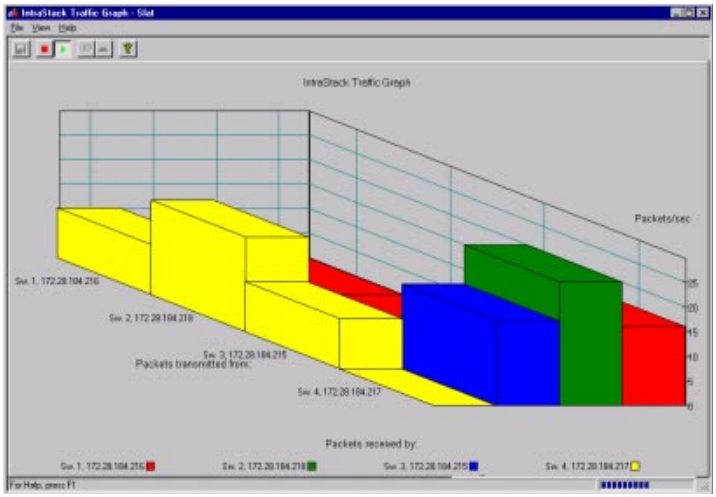

Switch Health : Critical - Skrubsak
File Options Help
Switch 1 Switch 2 Switch 3 Switch 4
IP address: 172.28.184.218 172.28.184.216 172.28.184.215 172.28.184.217
Device type: 510T 550T 550T 550T
Ping replying: Yes Yes Yes Yes
Error log entries: None None None None
Utilization%: 19% 12% 13% 12%
Buffer pool used: 0% 0% 1% 1%
Temperature: Normal Normal Normal Normal
Redundant PSU: Not Present Not Present Not Present Not Present
General Condition: Warning Warning Warning Critical
For Help, press F1

If the condition of any of the switches alters, the changes are displayed on screen.

Monitoring IntraStack activity

To view the total activity of the packets between the switches in the stack, or across the Matrix Module:

1 Right-click the stack border and select `IntraStack Traffic`



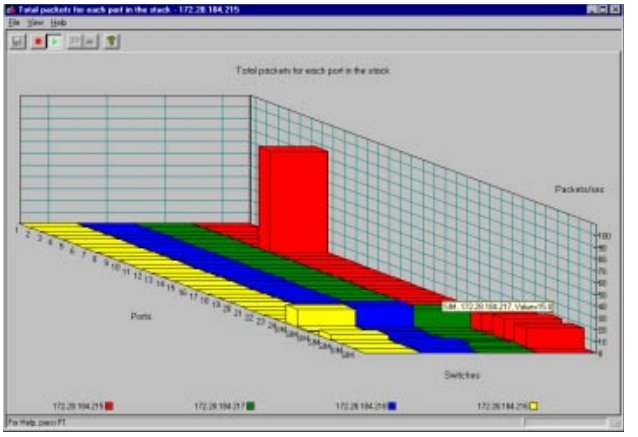
Each column represents a Matrix Module port and its activity level.

2 To see the exact value, hold the mouse pointer over a port.

Monitoring the total packet activity per port

To view the total activity of the packets on all the ports:

1 Right-click the stack border and select `Stack Activity>Total Packets per Port`.



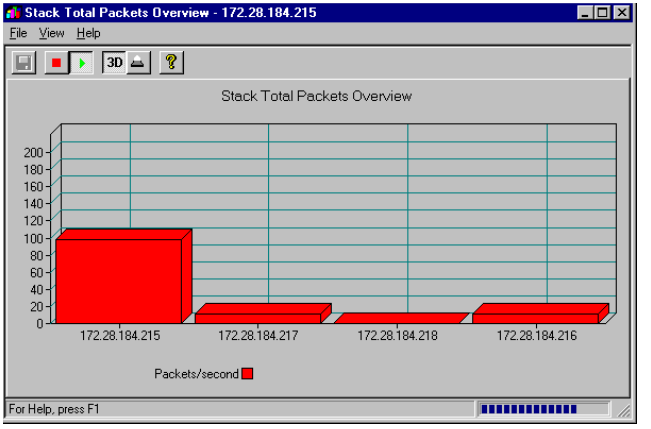
Each column represents a port and its activity level.

2 To see the exact value, hold the mouse pointer over a port.

Monitoring the total packet activity of the switches

To view the total activity of the packets on all the ports:

1 Right-click the stack border and select `Stack Activity>Total Packets`.



Each column represents a switch and its activity level.

2 To see the exact value, hold the mouse pointer over a switch.

3 Click `View` and change the presentation style: 3D- to 2D-Graph, with or without a peak value indicator and vertical to horizontal bars.

Monitoring the total activity of transmitted packets

To view the total activity of the packets being transmitted on all the switches:

1 Right-click the stack border and select `Stack Activity>Tx Packets`.

Each column represents the activity level on a switch.

2 Hold the cursor on a column to see the exact value.

3 Click `View` and change the presentation style: 3D- to 2D-Graph, with or without a peak value indicator and vertical to horizontal bars.

Monitoring the total activity of received packets

To view the total activity of the packets being received on all the switches:

1 Right-click the stack border and select `Stack Activity>Rx Packets`.

Each column represents the activity level on that switch.

2 Hold the cursor on a column to see the exact value.

3 Click `View` and change the presentation style: 3D- to 2D-Graph, with or without a peak value indicator and vertical to horizontal bars.

Monitoring the total number of errors

To view the total error activity of the packets on all the switches:

1 Right-click the stack border and select `Stack Activity>Errors`.

Each column represents the activity level on that switch.

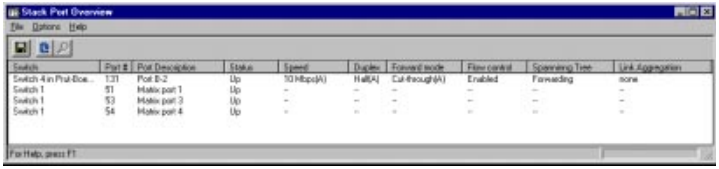
2 Hold the cursor on a column to see the exact value.

3 Click `View` and change the presentation style: 3D- to 2D-Graph, with or without a peak value indicator and vertical to horizontal bars.

Overview of all the ports

To view the setups of all the ports in the stack:

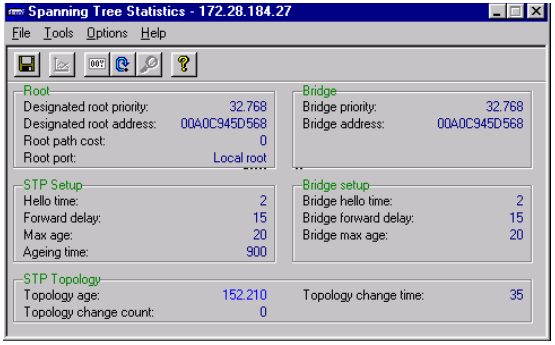
1 Right-click the stack border and select `Port Overview`.



2 Double-click a port to get the specific details for that port: port performance, faults, distribution and spanning tree information.

Monitoring the spanning tree statistics

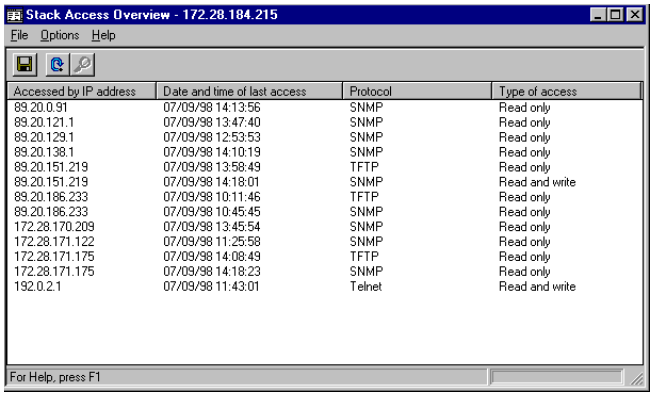
To view the spanning tree statistics for the whole switch, right-click a specific switch and select `Spanning Tree`.



Stations on the switch

To view the IP addresses of the devices on the switch:

1 Select `Monitoring>Access Overview`.



2 To change the order of the information, click the appropriate title bar.

Monitoring VLANs and Routing

General information

The information provided in this section is switch specific. To get information about a switch, including switches in a stack, right-click that switch.

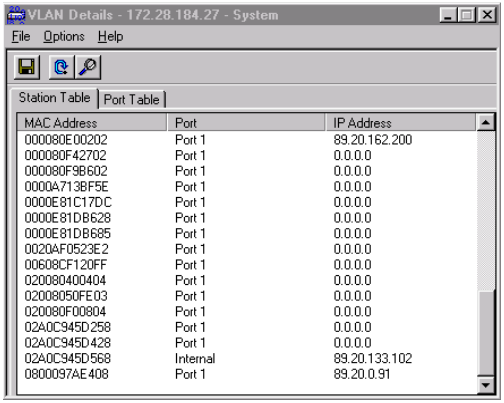
Overview of the VLANs on a switch

To view the VLANs on the switch:

1 Select `VLAN>Monitoring`.

This shows a full list of VLANs active on the switch or in the domain (if distributed VLAN or stand-alone for a stack). To view this window from the Explorer, right-click the VLAN name and select `Monitor`.

2 Click the name of the VLAN, then click `Details` to view details of that VLAN:



Click either of the tabs to view more details:

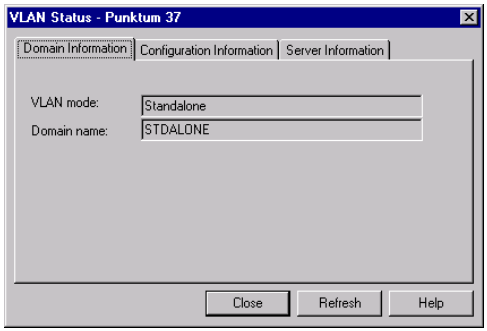
Tab Name:	Shows the VLAN's...	Double-click a row to show...
Station Table	MAC addresses, Ports and IP addresses	all VLANs in which this address is contained
Port Table	Port number and Port name	the MAC and IP address of all devices on the port in this VLAN

IP addresses will be present only if the station is learned by this switch and has sent an ARP packet.

Information about the domain

To view the VLAN mode and Domain name:

1 Select `VLAN>Status`.



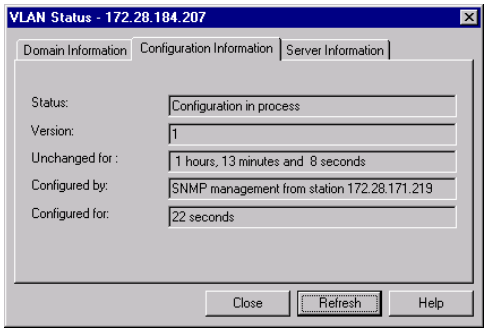
2 To change the information, see “Changing VLAN mode” in “VLANs (Virtual LANs)”, p. 69.

Information about VLAN configuration

To see if another user is configuring the VLANs, view the version number of the VLAN configuration or the time this configuration has been running:

1 Select `VLAN>Status`.

2 Click `Configuration Information`



The bottom 2 lines in this window are not displayed when the status is idle, for example nobody is editing the VLAN.

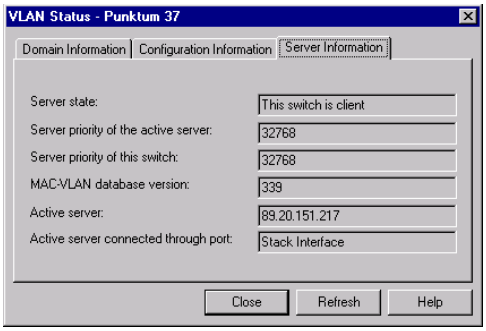
Information about the server

This provides status information about the server:

Note This information is only available from switches in a stack or from switches in a distributed VLAN.

1 Select `VLAN>Status`.

2 Click `Server Information`



VLAN links to other switches

To view the links between switches in a distributed VLAN:

Note This information is only available from switches in a stack or from switches in a distributed VLAN.

1 Select `VLAN>Switch VLAN Links`.

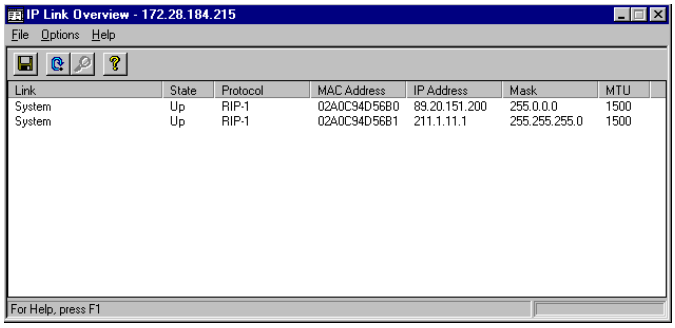
This shows the IP address and MAC address of the other switches connected to each port in this distributed VLAN.

2 Click the appropriate title bar to change the order of the information.

Monitoring IP links

To view the IP Routing links:

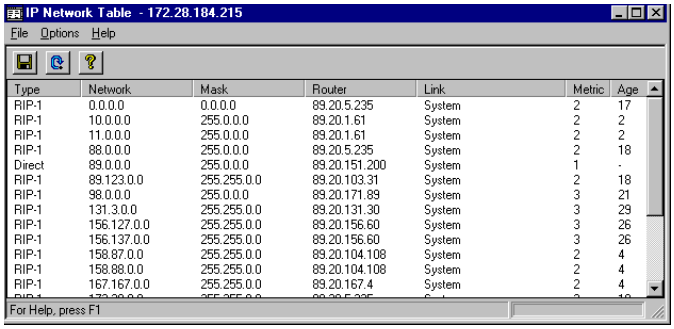
1. Select `IP Routing>Links`.


IP Link Overview - 172.28.184.215
File Options Help
Link State Protocol MAC Address IP Address Mask MTU
System Up RIP-1 02A0C94D56B0 89.20.151.200 255.0.0.0 1500
System Up RIP-1 02A0C94D56B1 211.1.11.1 255.255.255.0 1500
For Help, press F1

2. Double-click a link to get the specific details about that link: counters, setup and ARP table information.
3. To present the `Counters` information as a graph, double-click the parameter you are interested in.

Monitoring IP networks

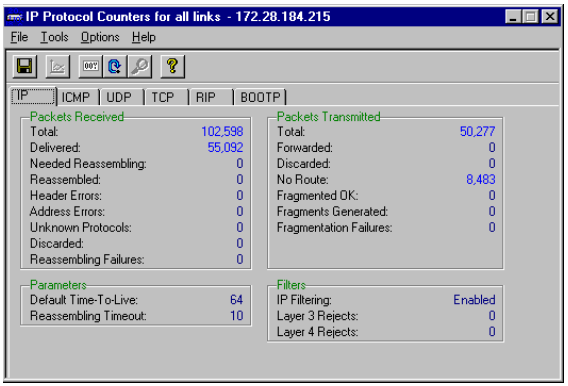
To view the IP network table, select `IP Routing>Networks`.



Monitoring IP counters

To view the IP protocol counters for all links:

1 Select `IP Routing>Counters`.

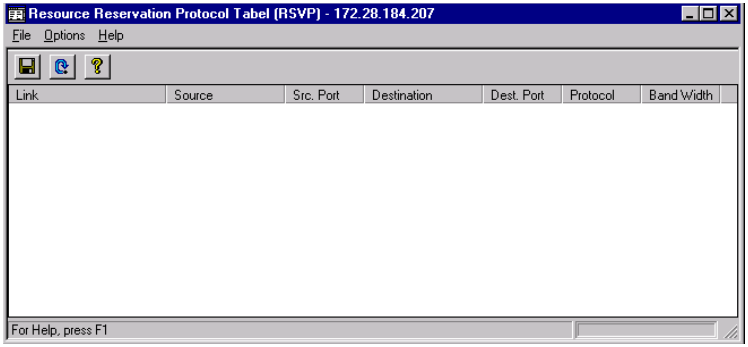


2 Click the protocol to get the specific details on that protocol: packets received and packets transmitted.

3 To present the information as a graph, double-click the parameter you are interested in.

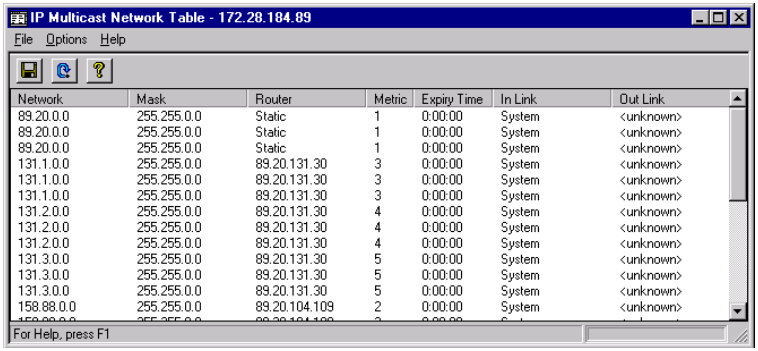
RSVP tables

This table shows the IP addresses and ports on the links used to reserve bandwidth. To view the RSVP table, select `IP Routing>RSVP Table`.



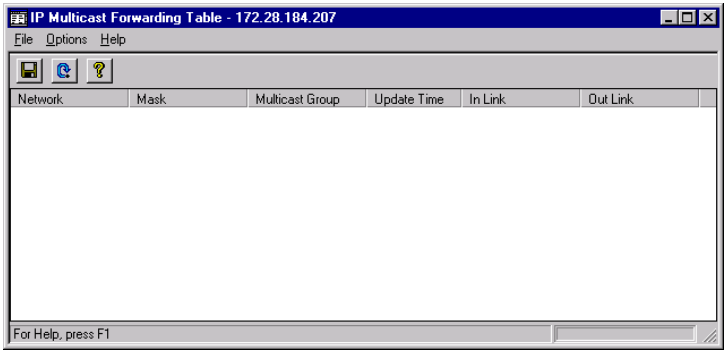
IP multicast networks

This table provides information about the topology of accessible subnets that have DVMRP routers. To view the multicast network table, select `IP Routing>IP Multicast>Network`:



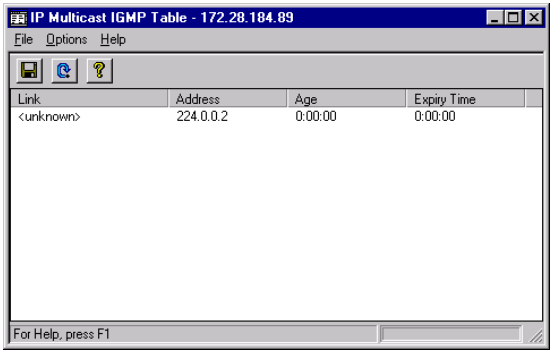
IP multicast forwarding

This table provides information about how IP multicast packets are forwarded. To view the multicast forwarding table, select `IP Routing>IP Multicast>Multicast Forwarding.`


IP Multicast Forwarding Table - 172.28.184.207
File Options Help
Network Mask Multicast Group Update Time In Link Out Link
For Help, press F1

IGMP table

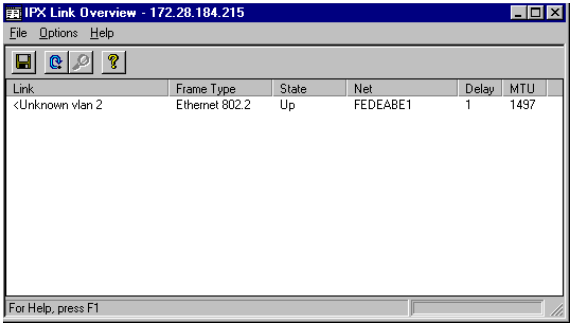
This table provides information about routers that want to receive multicast packets at a specific address. To view the IGMP table, select `IP Routing>IP Multicast>IGMP`.



Monitoring IPX links

To view the IPX Routing links:

1 Select `IPX Routing>Links`.

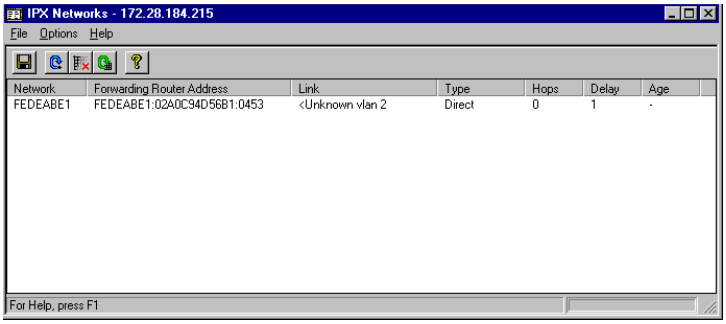

IPX Link Overview - 172.28.184.215
File Options Help
Link Frame Type State Net Delay MTU
<Unknown vlan 2 Ethernet 802.2 Up FEDEABE1 1 1497
For Help, press F1

2 Double-click a link to get the specific details on that link: counters, setup and ARP table information.

3 To present the `Counters` information as a graph, double-click the parameter you are interested in.

Monitoring IPX networks

To view the IPX network table, select `IPX Routing>Networks`.



Monitoring IPX services

To view the IPX services, select `IPX Routing>Services`.

Monitoring IPX counters

To view the IPX protocol counters for all links:

1. Select `IPX Routing>Counters`.
2. Click the protocol to get the specific details for that protocol: packets received and packets transmitted.
3. To present the information as a graph, double-click the parameter you are interested in.

Monitoring the Port's Performance

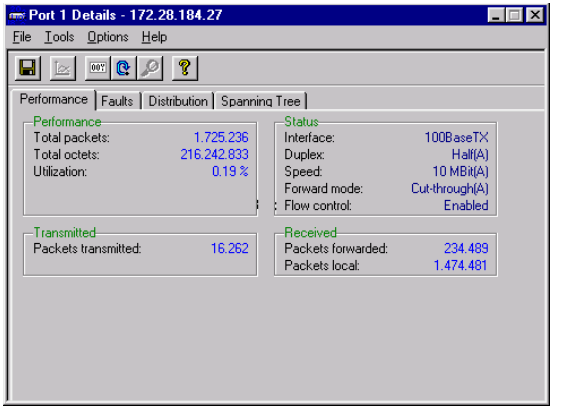
Using the LEDs

Using the Device View of the switch, the different colored LEDs on the ports indicate the different states of activity. Select `Help>Display Legend` for further information on LED states.

Monitoring the performance of a port

To monitor the performance of a specific port:

1. Right-click the port.
2. Select `Port Details>Performance`.



   This table shows the total number of frames and bytes, utilization of the ports and the number of packets transmitted and received.

3. To change the display from numerical to graphical, click one or more of the numbers and select `Tools>Graph`.
4. Select `Options>Reset Counters` to set all these counters to zero.

Monitoring the faults on a port

To monitor the faults on a specific port:

1. Right-click the port.
2. Select `Port Details>Faults`.

   This table shows the total number errors, discards and observations transmitted and received.

3. To change the display from numerical to graphical, click one or more of the numbers and select `Tools>Graph`.
4. Select `Options>Reset Counters` to set all these counters to zero.

Monitoring the distribution on a port

To monitor the distribution percentages of unicast, multicast and broadcast frames on a specific port:

1. Right-click the port.
2. Select `Port Details>Distribution`.

Monitoring the spanning tree statistics on a port

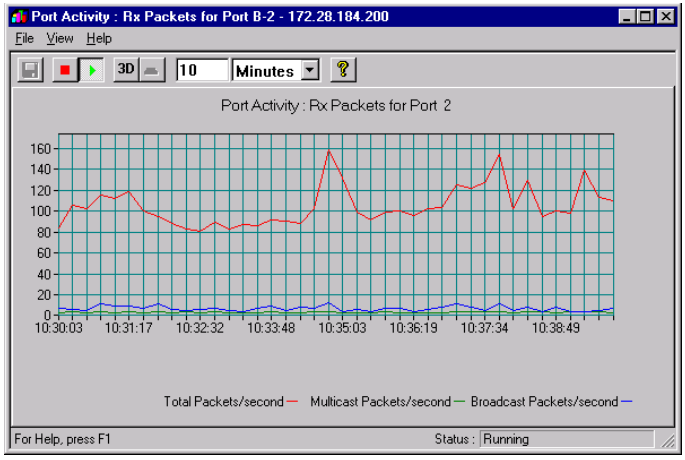
To monitor the spanning tree statistics on a specific port:

1. Right-click the port.
2. Select `Port Details>Spanning Tree`.

Monitoring the received packets on a port

To monitor the received packets on a specific port:

1. Right-click the port.
2. Select `Port Activity>RX Packets`:



3. To change the graph, click `3D`.
4. To freeze the graph, click `View>Stop Collection`.

Monitoring the packets transmitted from a port

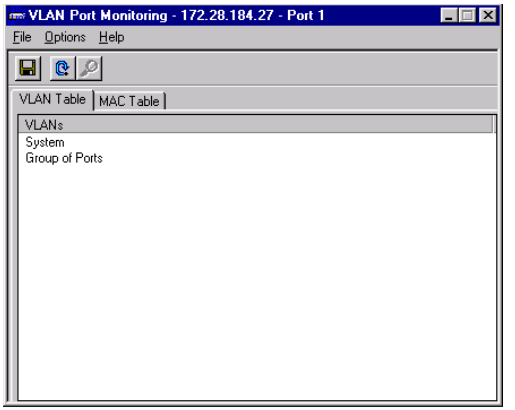
To monitor the transmitted packets on a specific port:

1. Right-click the port.
2. Select `Port Activity>TX Packets`.
3. To change the graph, click `3D`.
4. To freeze the graph, click `View>Stop Collection`.

Monitoring the VLANs on a port

To view the VLANs on the port:

1 Right-click and select `VLAN Port Monitoring`.



2 Click either of the tabs to view details of that port:

Tab Name	Shows the VLAN's...	Double-click a row to show the...
VLAN Table	in which this port is contained	MAC addresses learned on this port in that specific VLAN
MAC Table	MAC addresses and IP addresses	other VLANs in which this address is contained

RMON Interface statistics

To access a range of subnet management statistics:

1 Right-click a port and select `RMON Statistics`.

2 This window gives more detailed information displayed as graphs.

Tools for the Switch

Tools available

The switch has various tools to help with management:

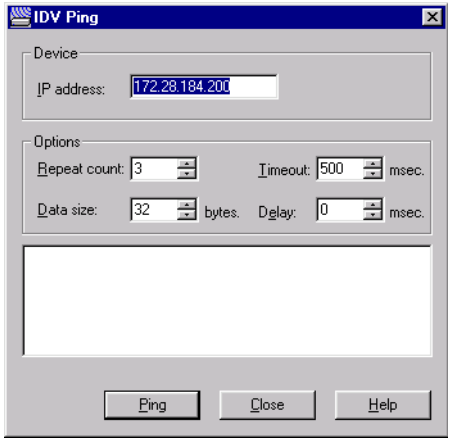
Use...	To...
Ping	Ensure a device is connected to the network.
Report Manager	Transfer files from a remote switch to your local disk or file server.
Telnet	Access the switch from any workstation on the network using Telnet.
Recovery Manager	Regain control of your switch.
DNS IP Conversion	Converts DNS names to IP addresses.

Ping

Pinging a device

Use Ping to ensure a device is attached to the network. If the device is on a remote network, you may need to adjust the timeout in order to receive the response.

1 Select `Tools>Ping`.



2 Double-click `IP Address`, and type the correct IP address for the device you want to ping.

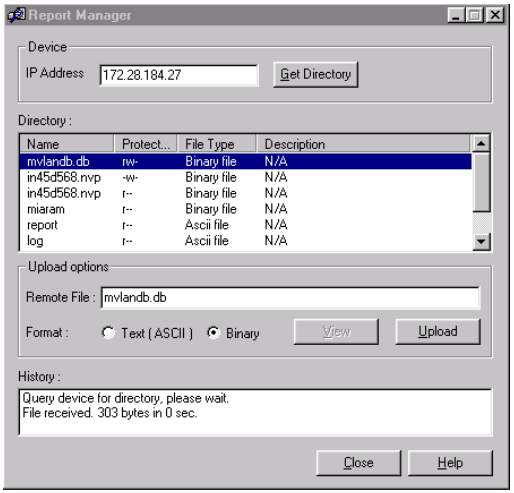
3 Change the settings in the fields if required, and click `Ping`.

Report Manager

Using the Report Manager

To view a log or report:

1 Click `Tools>Report Manager`. If you are managing a stack, select the IP Address of the individual switch.



2 Double-click `IP Address`, and type the correct IP address for the device you want to receive the directory.

3 Select a directory from the `Directory` list box, and click `View`.

Telnet

Purpose

The switch's Telnet facility has the following main features:

- It can be accessed from any workstation on the network using Telnet
- Access can be password protected to exclude unauthorized personnel
- Two distinct levels of management rights: administrator and user

- Log files (to pinpoint trouble sources) to provide diagnostic information for troubleshooting
- Detailed system information and operational statistics

What does it do?

This facility is divided into four parts:

- Configuration

  Allows you to change the basic configuration parameters of the switch, reset some of the configuration as well as save and load backups of the configuration.

- Monitoring shows:
  - A hardware and software overview
  - Details on messages from the system log
  - Normal traffic throughput
  - Number of errors, discards, observations and collisions for the switch
  - An overview of port-specific errors, discards, observations and collisions
  - Spanning Tree Protocol for the switch bridge and specific ports
  - MAC addresses on specific ports, and which ports have no MAC addresses
  - VLAN details
- Troubleshooting shows:
  - A diagnostics log
  - A log of errors due to software and hardware failures
  - How to overcome the limitations that exist in some management applications (RMON)
  - The option to reset all the counters being used for diagnostic purposes
  - VLAN Forced Release

- Software Update lets you:
  - Load new software to the switch
  - Reset the switch if necessary
  - Monitor the software status

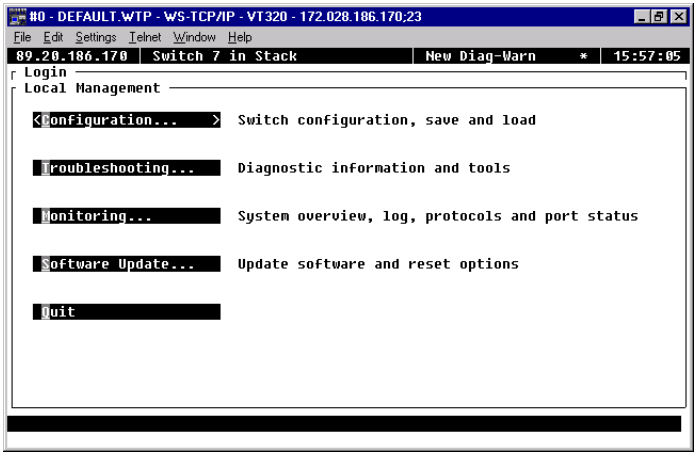
Access to the Local Management application

Instructions on how to access the application have been mentioned earlier:

- Access from the `CONSOLE` port
  Details are in *Quick Start*.
- Access using Telnet
  Select `Tools>Telnet`.

Finding the details

After a successful login, the Telnet main menu is displayed:


#0 - DEFAULT.WTP - WS-TCP/IP - VT320 - 172.028.186.170;23
File Edit Settings Telnet Window Help
89.20.186.170 Switch 7 in Stack New Diag-Warn * 15:57:05
Login
Local Management
Configuration... Switch configuration, save and load
Troubleshooting... Diagnostic information and tools
Monitoring... System overview, log, protocols and port status
Software Update... Update software and reset options
Quit

Recovery Manager

Purpose

Use the Recovery Manager if the software in your switch is corrupted or a software download to the switch failed, or you have moved a configured switch from another net, forgotten the switch's IP address, or simply lost control of the switch.

Intel Recovery Mode Manager - Start
Recovery
Welcome to the Recovery Mode Manager.
This enables you to regain control of your device if you have forgotten the IP Address or just lost contact with it.
This PC must be physically connected to the device in order to use the Recovery Mode Manager.
WARNING: using Recovery Mode may require you to reconfigure your device.
Press Next to continue
< Back
Next >
Cancel
Help

Note The Recovery Mode Manager only works when the switch is set in Recovery Mode.

Using the Recovery Mode Manager

To regain control of the switch:

1. Locate the Reset button on the front of the switch. Use a pointed object, for example a paper clip, press and hold (approximately 40 seconds) the Reset button until the Status LED blinks green slowly.
2. In Intel Device View, select `Tools>Recovery Manager`.
3. Follow the instructions in the wizard to regain control.

DNS IP Conversion Tool

Using the DNS IP Tool

DNS names are resolved by a DNS server or a Hosts file. The station running Intel Device View must be configured to use the DNS server when a Hosts file is not used. To convert DNS names to IP addresses:

1. Type in the DNS name.
2. Click `Convert.`
3. The IP address is displayed.

4 Click `Close`.

Tools for the Stack

Tools available for a stack

When managing a stack, the following tools are available:

Stack Synchronization Manager

Purpose

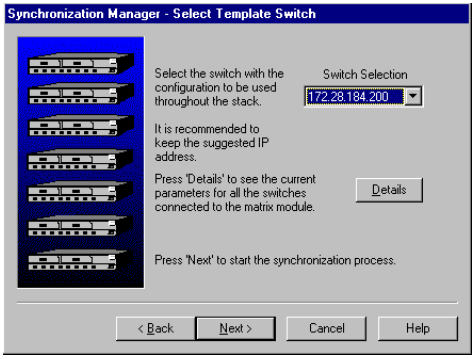
Before switches connected together via a Matrix Module can be managed as a stack, their configurations must be synchronized. This manager checks that all the configurations are compatible. The configurations for all the switches are then synchronized from a specified switch.

Using the Synchronization Manager

To start the Synchronization Manager:

1 Select `Tools>Stack Synchronization Manager`.

2 Follow the checks made and then click `Switch Selection` and select the IP address for the switch with the configuration that is to be copied to the other switches.


Synchronization Manager - Select Template Switch
Select the switch with the configuration to be used throughout the stack.
Switch Selection
172.28.184.200
It is recommended to keep the suggested IP address.
Press 'Details' to see the current parameters for all the switches connected to the matrix module.
Details
Press 'Next' to start the synchronization process.
< Back
Next >
Cancel
Help

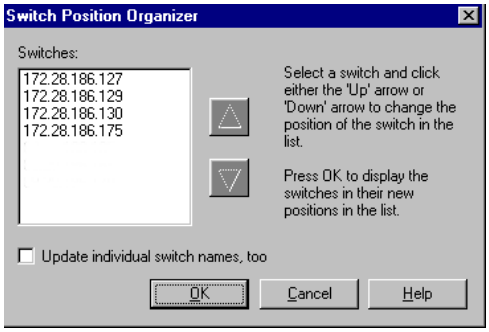
3 Click `Next>` to complete the synchronization of the switches.

Switch Position Organizer

Using the Switch Position Organizer

This tool enables you to reposition the switches displayed on screen, so they have the same relative position to each other as the physical switches in the stack. To reposition a switch:

1 Select `Tools>Switch Position Organizer`.


Switch Position Organizer
Switches:
172.28.186.127
172.28.186.129
172.28.186.130
172.28.186.175
Select a switch and click either the 'Up' arrow or 'Down' arrow to change the position of the switch in the list.
Press OK to display the switches in their new positions in the list.
Update individual switch names, too
OK
Cancel
Help

2 Click the switch's IP address.

3 Use the arrows to change the position of the IP address in the list.

4 To update the names of the individual switches to match the physical position view, check the `Update individual switch names too`.

5 Click `OK`. The switches in Device View now change position. The new order is stored in the switch, so the order is maintained regardless of where you manage them.

Color Code Matrix Ports

Purpose

Enabling this tool colors the individual ports on the Matrix Module. This simplifies the task of tracing cables, as the ports on the Stack Interface Modules become the same color as the port they are connected to on the Matrix Module.

Color Coding

Each Matrix port has a unique color:

- Port 1 – brown
- Port 2 – yellow

- Port 3 – dark yellow
- Port 4 – dark cyan
- Port 5 – purple
- Port 6 – cyan
- No connection – dark gray

6 Redirect TCP Packets

Introduction

Purpose

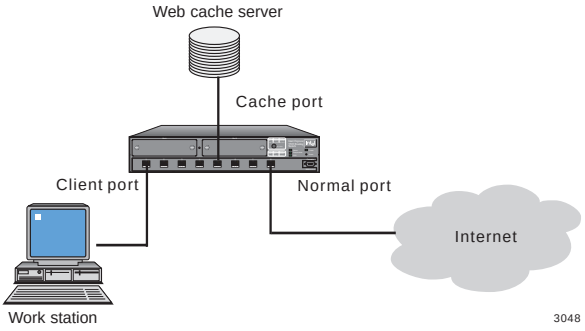
Too many users (on a LAN) requesting the same information from the Internet can cause congestion on the WAN link. A single stand-alone Express 550T Routing Switch can redirect TCP packets from popular sites and make a local copy of them in one of up to four Web Server Caches. Users requesting the same information are then supplied with a copy from the local server cache. This reduces WAN bottle-necks and uses the available bandwidth more efficiently.

TCP packets are redirected using their TCP port numbers. For example, HTTP packets (TCP port number 80) are commonly redirected, while e-mail packets (TCP port number 25) would not normally be redirected to a server cache. The TCP port numbers and their respective destinations are defined from within Intel Device View.

Configuration

TCP packet redirection is only possible through the front ports of this switch (including ports in installed 4TX and 2FX modules). The ports are set to function in one of three ways: “Client” ports connect work-

stations to the network; “Cache” ports are connected to individual cache servers, although a maximum of four is permitted; “Normal” ports connect to the Internet.



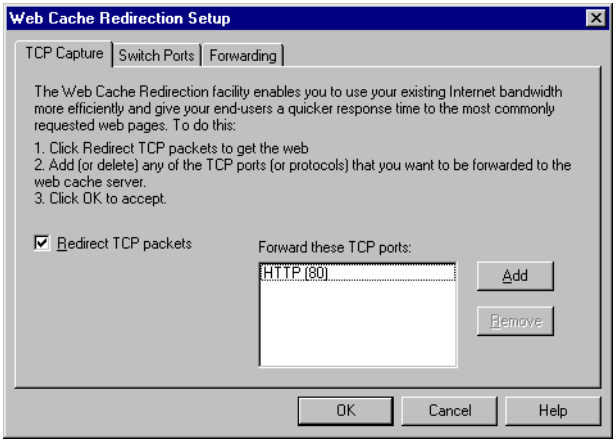
Note Cache servers are not supported through high-speed modules (1000Base or 155 ATM) installed in the switch and cache servers must be on the same subnet as the Internet router. Multple links between the switch and the cache server cannot be link aggregated.

Setting up redirection

Enabling TCP packet redirection

TCP packets can only be redirected in a stand-alone Express 550 Series Switch. To enable redirection:

1. Select `Web Cache Redirection>Setup`.
2. Select `TCP Capture`.

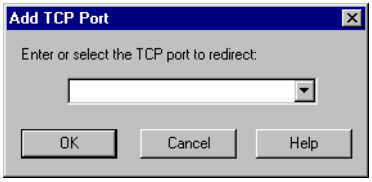

Web Cache Redirection Setup
TCP Capture
Switch Ports
Forwarding
The Web Cache Redirection facility enables you to use your existing Internet bandwidth more efficiently and give your end-users a quicker response time to the most commonly requested web pages. To do this:
1. Click Redirect TCP packets to get the web
2. Add (or delete) any of the TCP ports (or protocols) that you want to be forwarded to the web cache server.
3. Click OK to accept.
Redirect TCP packets
Forward these TCP ports:
HTTP (80)
Add
Remove
OK
Cancel
Help

3. Click `Redirect TCP packets`.
4. Set up any TCP Ports required.
5. Click `OK`.

Adding a TCP port

Only TCP ports listed in the TCP Capture dialog are redirected. To add a new port:

1. Select `Web Cache Redirection>Setup`.
2. Select `TCP Capture`.
3. Click `Add`.



4 Select the TCP port from the drop-down list or type in the TCP port number, and click `OK`.

Note Any new TCP port number, not previously shown, is now added to the drop-down list.

5 Click `OK`.

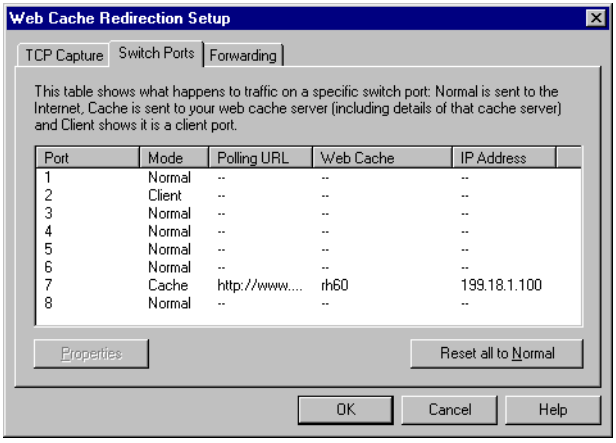
Setting switch port mode

The ports on the front of the switch can be set to one of three modes: Normal, Cache or Client. These mode settings determine where the traffic passing through the port is sent. To set the port mode:

Note These port modes are only valid when Redirect TCP packets is enabled.

1 Select `Web Cache Redirection>Setup`.

2 Click `Switch Ports`.


Web Cache Redirection Setup
TCP Capture
Switch Ports
Forwarding
This table shows what happens to traffic on a specific switch port: Normal is sent to the Internet, Cache is sent to your web cache server (including details of that cache server) and Client shows it is a client port.
Port Mode Polling URL Web Cache IP Address
1 Normal -- -- --
2 Client -- -- --
3 Normal -- -- --
4 Normal -- -- --
5 Normal -- -- --
6 Normal -- -- --
7 Cache http://www.... rh60 199.18.1.100
8 Normal -- -- --
Properties
Reset all to Normal
OK
Cancel
Help

3 Select the correct switch port and click `Properties.`

4 Assign the correct port mode. For ports assigned as Cache ports, a polling URL and the IP address of the cache server must be assigned.

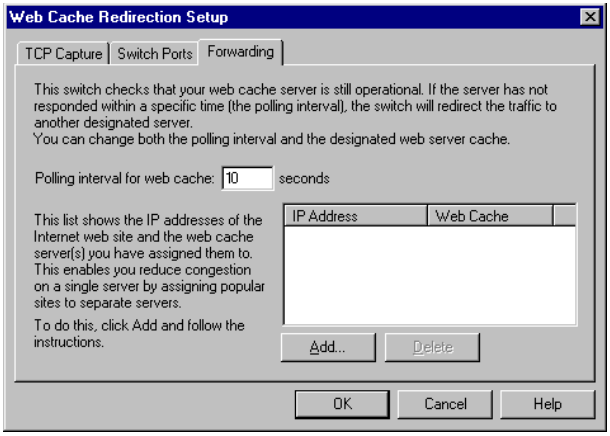
5 Click `OK`.

Setting the polling interval

To ensure that the server cache remains in contact with the Internet, a designated URL (defined in the switch port properties dialog) is periodically polled. The interval between polls is defined here. If a timeout is experienced, due to the server cache no longer being in contact, then traffic is redirected to another designated server. If no server cache is online, then traffic is routed to the Internet router. To set the polling interval:

1 Select `Web Cache Redirection>Setup`.

2 Select `Forwarding`.


Web Cache Redirection Setup
TCP Capture
Switch Ports
Forwarding
This switch checks that your web cache server is still operational. If the server has not responded within a specific time (the polling interval), the switch will redirect the traffic to another designated server.
You can change both the polling interval and the designated web server cache.
Polling interval for web cache:
10
seconds
This list shows the IP addresses of the Internet web site and the web cache server(s) you have assigned them to. This enables you reduce congestion on a single server by assigning popular sites to separate servers.
To do this, click Add and follow the instructions.
IP Address
Web Cache
Add...
Delete
OK
Cancel
Help

3 Type the desired interval (range: 1 to 10 000 seconds).

Note It is recommended to poll cache servers frequently in order to ensure connectivity

4 Click `OK`.

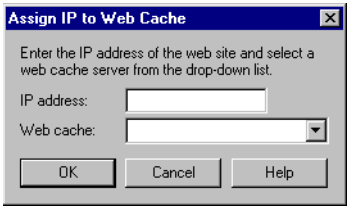
Assigning specific sites to a server cache

When several very popular sites have their TCP packets redirected to the same server, the server may become congested. To prevent this, popular sites can be assigned to separate server caches. To setup a popular site to a server cache:

1 Select `Web Cache Redirection>Setup`.

2 Select `Forwarding`.

3 Click `Add`.


Assign IP to Web Cache
Enter the IP address of the web site and select a web cache server from the drop-down list.
IP address:
Web cache:
OK
Cancel
Help

4 Type the DNS name or IP address of the popular site and select one of the server caches available from the drop-down list, and click `OK`.

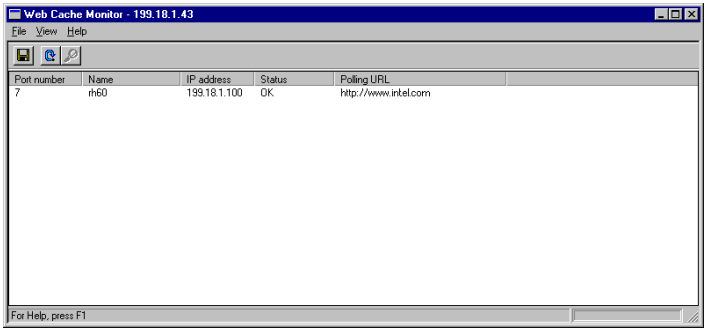
5 Click `OK`.

Monitoring the status of the cache servers

Monitor cache servers

Web cache monitoring enables you to check the state of each cahe server and its connectivity. To view the status:

1 Select `Web Cache Redirection>Monitor`.



7 Technical Specifications

In this chapter

This chapter covers the following topics:

Topic	See Page
Physical Specifications	118
Power Specifications	120
Performance Specifications	120

Physical Specifications

Approvals

The switch has the following approvals:

Approval for	Standard
Safety	UL 1950 CSA-C22.2 No. 950 IEC 950 EN 60950
Emission	FCC 47 CFR part 15 Class A EN 55022 Class A CISPR 22 Class A VCCI Class 1 ITE “C-Tick” Mark CNS 13438 Class A
Susceptibility	EN 50082-1 IEC 1000-4-2 IEC 1000-4-3 IEC 1000-4-4 IEC 1000-4-5
CE Mark	Yes

Physical

The switch has the following physical specifications:

Specification	Measurement
Dimensions	Width: 17.35 in. (441 mm) Height: 3.26 in. (83 mm) Depth: 12.95 in. (329 mm)
Weight (approximate)	15 lb. (6.7 kg)
Recommended clearance	Sides: 4.0 in. (100 mm) Rear: 7.7 in. (190 mm)

Environmental

The switch has the following environmental specifications:

Operating temperature	+41°F to +104°F (+5°C to +40°C)
Storage temperature	–13°F to +158°F (–25°C to +70°C)
Humidity	Less than 85% non-condensing
Altitude	10000 feet (3048 meters)

LEDs

The switch has the following number of LEDs:

Status of	Number of LEDs
Port	16
Power	1
Status	1
Temperature	1
RPS	1

Connections

The switch has the following number of connections:

Connections	Number
10/100 Mbps 10/100BaseTX (RJ-45)	8
CONSOLE port (DB-9 male)	1

Power Specifications

Consumption

Power consumption: 100 W maximum

Power supply

The power supply has:

Nominal power supply voltages	100 to 120 V AC, 2.5 A 200 to 240 V AC, 1.5 A Class 1 protective ground
Voltage range	90 to 135 V 180 to 265 V
Frequency	47 to 63 Hz
Main power connection	Detachable power cable
Input protection	Non-replaceable, internal fuse

Performance Specifications

MAC addresses

The number of MAC addresses:

MAC addresses per port	Number of ports available for multiple addresses
Max 8000	All

Throughput

Internal backplane bandwidth: 2.1Gbps

CPU

IDT 79R3052 (40 MHz)

Memory sizes

The memory sizes are as follows:

Memory	Switch
Flash Memory (MB)	4
CPU RAM (MB)	4
Buffer RAM (MB)	8

Supported protocols

This switch supports the following protocols:

Subject	Document Reference
Bridge/Spanning Tree	IEEE 802.1d
Ethernet	IEEE 802.3
Fast Ethernet	IEEE 802.3u
Full duplex flow control	IEEE 802.3x
Gigabit Ethernet	IEEE 802.3z
UDP	RFCs 768, 950 and 1071
TFTP	RFC 783
IP	RFC 791
ICMP	RFC 792
TCP	RFC 793
ARP	RFC 826
Telnet	RFC 854 to 859
BOOTP	RFCs 906, 951 and 1350
RIP version 1	RFCs 950 and 1058
SMI	RFC 1155
SNMP	RFC 1157
MIB II	RFC 1213
Ethernet-like MIB	RFC 1398
Bridge MIB	RFC 1493

Subject	Document Reference
Ether-like MIB	RFC 1643
RIP version 2	RFC 1723
RMON	RFC 1757
IGMP version 2	RFC 1112
DVMRP version 3	RFC 1075
RSVP version 1	RFC 2205

8 Console Port Use and Troubleshooting

In this chapter

This chapter covers the following topics:

Topic	See Page
Use of the Console Port	124
Troubleshooting Tools	129
Troubleshooting Procedure	129
Typical Problems and Causes	130
Reporting the Problem to Intel Customer Support	133

Use of the Console Port

Purpose of Console Port

If you lose contact with the switch and the Recovery Manager in Intel Device View or Local Management over the LAN cannot contact it, then the following is possible via the Console port on the front of the switch.

Local Management

During normal operation (the switch is running and the Status LED is green) the Console port will give access to a menu, identical to the one accessible via a telnet connection to the switch. The menu allows configuration of basic parameters, extensive monitoring, flash operations, reset of the switch etc.

Maintenance Mode

If the switch is failing for some reason (System LED goes red), and cannot start correctly after a reset, this may be caused by either hardware failure, corruption of the software, or corruption of the switch configuration. To allow recovery from such a situation when the Recovery Manager of Intel Device View cannot be applied, the maintenance mode is provided. In the following, various problems are described as well as the way they are solved using maintenance mode. In the next section it is explained how to start and use the maintenance mode.

Note Loading software to the switch in Maintenance Mode should only be done as a last resort, the reason being that the software and configuration are already resident in the flash memory is overwritten and lost.

Switch Software

The software for the switch (including a default configuration) resides in the switch's flash memory. A backup of the software is provided on the CD delivered with the switch, and the newest software versions may be downloaded via the Internet. The software files may be used for restoring or upgrading the switch software.

Restoring Software

The switch software may be restored/downloaded from a TFTP server, if the current software in flash memory has been corrupted. The TFTP and BOOTP commands may both be used to accomplish this. For the TFTP command an external TFTP server with the software must be present on the network. For the BOOTP command a BOOTP/TFTP server (also often referred to as a boot server) must be present.

Upgrading Software

If a working switch software needs to be upgraded, it is recommended to use the Software Upgrade Wizard in Intel Device View rather than the maintenance mode commands. This is easier and the existing configuration is retained.

Switch Configuration

The configuration information for the switch is stored in two files residing in flash memory. The two files are named after the MAC address of the switch. One of them, inxxxxxx.p, contains all the basic configuration parameters, while the other, STDALONE.nvp, contains the VLAN policy database.

Backing up the Configuration

The two configuration files may be backed up using a TFTP client on an external machine (e.g. MS Windows*, Unix* or other). Please follow the documentation for the TFTP client application for further instructions. However, it is recommended to use Intel Device View for doing backup of the configurations.

Restoring the Configuration

The two configuration files may be restored using a TFTP client on an external machine (e.g. MS Windows*, Unix* or other), if the switch configuration has been lost or corrupted. It is recommended to use Intel Device View for restoring the configurations rather than manual TFTP.

Reset to Factory Defaults

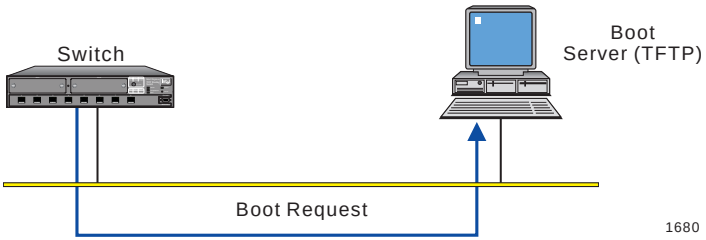
If the configuration in the switch has been corrupted in such a way that the switch is not able to start properly after reset (System LED goes red), it may be necessary to reset the switch configuration to factory defaults. The RUN Defparm command may be used to do this. Please note, that this will discard the existing configuration in the switch. This method may also be used, if the configuration by mistake has made it impossible to contact the switch by other means. It is also the only way to regain access to the switch, if the administrator password has been lost.

Recovering from Start-up Failure

Network boot process

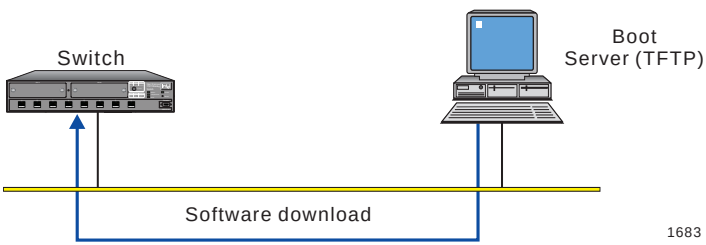
The network boot process is as follows:

1. The switch sends a BOOTP request over the network.



   The boot request contains the switch's MAC address. The boot server contains a bootptab file with an entry for the switch which is defined by the MAC address.

2. If a boot server which holds the software for the switch receives the boot request, it loads the boot software over the network to the destination MAC address.



Using Maintenance Mode

Purpose

Maintenance Mode offers three facilities:

- It allows you to force the switch to load a specified software file from any specified TFTP server.
- It provides an emergency facility to force boot the switch from a specified boot server if the switch cannot boot from Flash Memory. From Maintenance Mode the switch is forced to issue a

BOOTP request and the name of the boot software to a specified boot server. This is useful if the boot server being used does not support the use of a bootptab file.

- It runs tests on hardware and provides diagnostic information.

Note Loading software to the switch in Maintenance Mode should only be done as a last resort. This is because the software and configuration already resident in the flash memory is overwritten and lost.

Important considerations

Consider these points when using Maintenance Mode:

- The switch is not operational and the expansion board ports cannot be used.
- Only simple command-line access is possible via the `Console` port.
- There is a delay before you see the command prompt; this is due to a hardware test routine being completed.

To enter Maintenance Mode

To enter Maintenance Mode:

1. Using a pointed tool — such as a bent paper clip, press the `Reset` button on the front of the switch and hold it until the `SYSTEM` LED flashes green quickly (five times per second).
2. Release the `Reset` button.
3. Attach a VT100-compatible terminal to the serial port on the front panel using the cable supplied.
4. To display the command prompt on screen, press the Enter key a couple of times.

Commands allowed in Maintenance Mode

The following command is available for the switch in Maintenance Mode:

Command	Use
`TFTP <filename> ownIP tftpIP [gwIP]`	
	Loads software using the TFTP protocol
	`<filename>`: the name of the file containing the software
	`ownIP`: your own IP address
	`tftpIP`: the IP address of the TFTP host
	`[gwIP:` the IP address of the primary router (intermediate gateway)— required if the TFTP server is located on a remote part of the network
`BOOTP <filename>`	
	Loads software using the BOOTP or TFTP protocol
	`<filename>`: the name of the file containing the software
`DUMP addr`	Dumps memory contents
`INFO`	Shows hardware information
`RESET`	Resets the switch
`RUN defparm`	Starts the software in its default factory settings

bootptab file entry

The entry for the switch in the `bootptab` should contain a line similar to:

```
:bf=/intel/switch/es550_x.xx:
```

This instructs the switch to load the switch software from the bootp/tftp server. Use the Intel Device View application to configure the switch manually, or transfer the inxxxxxx.p file containing the configuration from a TFTP server to the switch.

Troubleshooting Tools

Troubleshooting tools available

The tools available for troubleshooting on the switch are:

The LED indicators

These are located on the front panel of the switch. The LEDs indicate the overall switch status, and the status of each of the switch's ports and backplane segments (where applicable). See earlier in this manual for a full description of the LEDs and their use.

SNMP

SNMP management in the switch is based on standard Management Information Base (MIB) II and Private Enterprise MIB extensions.

You can configure the switch to send SNMP Traps to defined locations, thus allowing the possibility of performing limited troubleshooting from an SNMP Management Center.

Intel Device View

Intel Device View offers several features that can help your troubleshooting. These include: diagnostic messages, a log of system events, a log of errors and a list of SNMP traps.

Troubleshooting Procedure

Isolating the Problem

To isolate the problem

If the switch has a problem, use the following procedure to isolate the problem:

1. Check the LEDs.

   The LEDs provide instant visual indication of the status of the switch and the status of each ports.

2. Check the `Diagnostics` window.

   The diagnostics tool automatically detects possible problems and indicates possible causes and solutions. Use of this tool is described in "Diagnostics Window", p. 37.

3. Check for any relevant messages in the `Trap` window.

   Use of this tool is described in “Trap Window”, p. 38.

4. Check for any relevant messages in the `System` window.

   The System Log gives details about system events that occur during start-up and operation and also the general state of the switch. Typical information recorded in the System Log includes all major events during start-up, system changes, unexpected events and configuration errors. The System Log reports such things as software successfully located and loaded, ports enabled or disabled, and if any SNMP traps have been sent. Use of this tool is described in “System Window”, p. 39

5. Check for any relevant messages in the `Errors` window.

   Use of this tool is described in “Errors Window”, p. 40.

6. Check the fault counters on the switch ports and watch for any significant error counters.

Further Evaluation of the Problem

If the problem is still not isolated

If you still cannot resolve the problem after following the procedures above, access the Monitoring menu within Local Management. Monitoring is a valuable tool for the troubleshooting process and offers extensive information on the performance and the status of the switch hardware and software, the switch ports and the traffic patterns on each port.

The general facilities available within the Monitoring menu are described in the following subsections. The use of these facilities depends on the problem and on any relevant information collected in the previous procedure.

Typical Problems and Causes

Typical problems that could be encountered

This section gives some examples of typical problems that could be encountered during the installation and configuration of the switch, and their possible cause. Configuration problems, defective cables and problems with communication among devices are the most common switch malfunctions.

Start-up Problems

I've forgotten my password

Explanation: You are prompted for a password on the `Login` screen.
Action: Enter Maintenance Mode, and type: `run defparm`.
Consequence: This resets the configuration to the default values so you can assign a new password.

When I make changes to the switch's configuration, they take effect but as soon as the switch is powered off and on again the changes are lost

Explanation: When you change the switch's configuration, you are changing the current active configuration that is running in RAM. However, every time the switch starts up it loads the configuration that is stored in its flash memory. Therefore, if you make a change to the configuration and want to keep it, you need to save the new configuration to the switch's flash memory.
Action: Save the configuration changes to flash memory.
To check the status of the configuration, select `Configuration>Software`.

Performance Problems

One or more workstations cannot communicate with a server or other device through the switch

Explanation: This symptom might be noticed on one or more segments connected to the switch, and could be caused by cable faults, inappropriate configuration or faulty installation.
Action: Check all connections and verify your configuration. Check any error counters for the ports.

The 100Mbps ports are not working, or work very poorly

Explanation: This is probably due to incorrect configuration of the auto-negotiation duplex settings and link speeds.
Action: Check the negotiated settings in the switch and compare them to the expected values.

I have poor performance and high numbers of second port drops

Explanation: There may be a loop in the network and Spanning Tree is not enabled.
Action: Avoid loops, or alternatively, either enable STP on all the ports (using `Device Setup`) or specific ports (using `Port Setup`).

Communication Problems

The most common problems are cable problems

A high percentage of faults are caused by cable faults such as loose connections or inappropriately wired cables.

Management PCs using IEEE 802.1Q tagged frames

A management PC using IEEE 802.1Q tagged frames may experience communication difficulties with the switch. To manage the switch from a PC connected directly to the switch, the PC must not use frame tagging. To manage the switch from a PC with IEEE 802.1Q tagged frames, management must be through a device which untags the frames.

Spanning Tree topology changes

When a change is detected in the Spanning Tree network, the devices forming the Spanning Tree go into a learning state to determine the optimal routes between network segments. During this learning state, the switch will not forward data traffic.

This is a normal occurrence for Spanning tree devices and no remedial action is required. However, if the switch goes into the learning state too frequently, the Spanning Tree may be unstable and should be examined and possibly reconfigured.

To troubleshoot communications problems

If the `POWER` LED and the `STATUS` LED are both on, but one or more of the port `STATUS` LEDs are off, then:

1. Reset the switch using the `Reset` button.
2. Check the `STATUS` LED for each switch port to which a cable is attached.

VLANs

The use of VLAN policies can lead to unexpected communication problems. If the policies are not designed with care, ports are not able to reach network services. Check your VLAN policies and use the VLAN monitoring to review the VLAN membership for that port or address.

Reporting the Problem to Intel Customer Support

Introduction

If you are unable to solve the problem and want to report the problem to Intel Customer Support, there are certain things that you can do, to enable us to begin solving your problem quickly. Intel Device View makes the gathering of such information easy, and presents it in an easy-to-interpret format.

Things to do prior to contacting Customer Support

To ensure that your problem gets treated as efficiently as possible. TFTP a report and parameter block from the switch. If it is not possible to TFTP from the switch, try to obtain the product number and the software ID and version number, any error messages in the Error and System Logs, and a copy of the switch's configuration.

Always supply the following information when contacting Customer Support for help:

- The scope and characteristics of the problem. How severe is the problem? Is the switch dead? Are any of the ports malfunctioning? If so, which ports? Is the whole network down?
- A quick sketch of your configuration.
- Is the problem reproducible? If yes, how?
- Is it a new installation, or has it been running for a while?
- When was the last time it was working correctly? What has happened since then that might have affected the switch?

The information in this report will help us to find a solution to the problem as quickly as possible.

Further information on Customer Support

For information about Intel's automated support service and how to contact our technical support technicians, see the information on the page inside the back cover.

Retrieving Information for Customer Support

Two methods available

If Intel Device View is still functioning, this information can be obtained using the Report Manager. If the Report Manager is not accessible, use TFTP procedures.

Files suitable for TFTP transfer

You can retrieve log files for analysis using TFTP. Here are two of the various files suitable for TFTP transfer:

Type	Name	Contains
ASCII	report	Information for Customer Support staff
	log	List of errors
Binary	miaram	Information for Customer Support staff
	filter	
	inxxxxxx.p	For example incd36d0.p A read/write parameter file which contains the information for configuring a switch somewhere else on the network.
	STDALONE.nvp	VLAN database

Transferring files to and from the switch using TFTP

To transfer files using TFTP:

1. At the command prompt, start a TFTP session with the switch.
2. To obtain a directory listing of all the files on the switch, type: `get dir`.
3. Examine the directory listing to confirm the names of the files present in the switch.

   Report, log and filter files and a parameter file with a .p or .nvp extension appear in the directory listing.
4. To retrieve the file that you want, type: `get <filename>`.

   Note If you “get” a report, then the report file is generated on-the-fly and transferred.

5 If the TFTP access is password protected, type: `get<password>/<filename>`. (For example, `get edinburgh/report`.)

A Limited Hardware Warranty

Limited Hardware Warranty

Intel warrants to the original owner that the hardware product delivered in this package will be free from defects in material and workmanship for three (3) years following the latter of: (i) the date of purchase only if you register by returning the registration card as indicated thereon with proof of purchase; or (ii) the date of manufacture; or (iii) the registration date if by electronic means provided such registration occurs within thirty (30) days from purchase. This warranty does not cover the product if it is damaged in the process of being installed. Intel recommends that you have the company from whom you purchased this product install the product.

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This warranty does not cover replacement of products damaged by abuse, accident, misuse, neglect, alteration, repair, disaster, improper installation or improper testing. If the product is found to be otherwise defective, Intel, at its option, will replace or repair the product at no charge except as set forth below, provided that you deliver the product along with a return material authorization (RMA) number either to the company from whom you purchased it or to Intel (North America only). If you ship the product, you must assume the risk of damage or loss in transit. You must use the original container (or the equivalent) and pay the shipping charge. Intel may replace or repair the product with either new or remanufactured product or parts, and the returned product becomes Intel's property. Intel warrants the repaired or replaced product to be free from defects in material and workmanship for a period of the greater of: (i) ninety (90) days from the return shipping date; or (ii) the period of time remaining on the original three (3) year warranty.

This warranty gives you specific legal rights and you may have other rights which vary from state to state. All parts or components contained in this product are covered by Intel's limited warranty for this product; the product may contain fully tested, recycled parts, warranted as if new. For warranty information call one of the numbers below.

Returning a Defective Product (RMA)

Before returning any product, contact an Intel Customer Support Group and obtain an RMA number by calling:

North America only: (916) 377-7000
Other locations: Return the product to the place of purchase.

If the Customer Support Group verifies that the product is defective, they will have the Return Material Authorization Department issue you an RMA number to place on the outer package of the product. Intel cannot accept any product without an RMA number on the package.

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This warranty gives you specific legal rights and you may have other rights which vary from state to state. All parts or components contained in this product are covered by Intel's limited warranty for this product; the product may contain fully tested, recycled parts, warranted as if new. For warranty information call one of the numbers below.

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Country	Number	Language
France	+33 (0) 1 41 91 85 29	French
Germany	+49 (0) 69 9509 6099	German
Italy	+39 (0) 2 696 33276	Italian
UK	+44 (0) 870 607 2439	English

If the Customer Support Group verifies that the product is defective, they will have the Return Material Authorization Department issue you an RMA number to place on the outer package of the product. Intel cannot accept any product without an RMA number on the package.

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Software: Software provided with the hardware product is not covered under the hardware warranty described above. See the applicable software license agreement which shipped with the hardware product for details on any software warranty.

This limited hardware warranty shall be governed by and construed in accordance with the laws of England and Wales. The courts of England shall have exclusive jurisdiction regarding any claim brought under this warranty.

Federal Communications Commission (FCC) Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

The user is cautioned that changes and modifications made to the equipment without approval of the manufacturer could void the user's authority to operate this equipment.

Manufacturer Declaration

Intel declares that the Express 500 Series Switches comply with the EU Directive 89/336/EEC, using the EMC standards EN55022 and EN50082-1. These products also meet EU Directives 74/23/EEC and 93/68/ and are certified by DEMKO to be compliant with EN 60950/A1/A2/A3 and by UL to be compliant with UL 1950 and CSA -C22.2 No. 950. These products have been tested and verified to meet CISPR 22 Class A requirements and are registered with VCCI Class 1 products.

WARNING

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

警告使用者 ：
這是甲類的資訊產品， 在居住的環境中使用時，
可能會造成射頻干擾， 在這種情況下，使用者會
被要求採取某些適當的對策·

WARNING

The system is designed to operate in a typical office environment. Choose a site that is:

- Clean and free of airborne particles (other than normal room dust).
- Well ventilated and away from sources of heat including direct sunlight.
- Away from sources of vibration or physical shock.
- Isolated from strong electromagnetic fields produced by electrical devices.
- In regions that are susceptible to electrical storms, we recommend you plug your system into a surge suppressor and disconnect telecommunication lines to your modem during an electrical storm.
- Provided with a properly grounded wall outlet.

Do not attempt to modify or use the supplied AC power cord if it is not the exact type required.

Ensure that the system is disconnected from its power source and from all telecommunications links, networks, or modems lines whenever the chassis cover is to be removed. Do not operate the system with the cover removed.

AVERTISSEMENT

Le système a été conçu pour fonctionner dans un cadre de travail normal. L'emplacement choisi doit Ítre:

- Propre et dépourvu de poussière en suspension (sauf la poussière normale).
- Bien aèrè et loin des sources de chaleur, y compris du soleil direct.
- A l'abri des chocs et des sources de ibrations.
- Isolé de forts champs magnétiques géenérés par des appareils électriques.
- Dans les régions sujettes aux orages magnétiques il est recomandé de brancher votre système à un supresseur de surtension, et de débrancher toutes les lignes de télécommunications de votre modem durant un orage.
- Muni d'une prise murale correctement mise à la terre.

Ne pas utiliser ni modifier le câble d'alimentation C. A. fourni, s'il ne correspond pas exactement au type requis.

Assurez vous que le système soit débranché de son alimentation ainsi que de toutes les liaisons de télécomunication, des réseaux, et des lignes de modem avant d'enlever le capot. Ne pas utiliser le système quand le capot est enlevé.

WARNUNG

Das System wurde für den Betrieb in einer normalen Büroumgebung entwickelt. Der entwickelt. Der Standort sollte:

- sauber und staubfrei sein (Hausstaub ausgenommen);
- gut gelüftet und keinen Heizquellen ausgesetzt sein (einschlie?lich direkter Sonneneinstrahlung);
- keinen Erschütterungen ausgesetzt sein;
- keine starken, von elektrischen Geräten erzeugten elektromagnetischen Felder aufweisen;
- in Regionen, in denen elektrische Stürme auftreten, mit einem Überspannungsschutzgerät verbunden sein; während eines elektrischen Sturms sollte keine Verbindung der Telekommunikationsleitungen mit dem Modem bestehen;
- mit einer geerdeten Wechselstromsteckdose ausgerüstet sein.

Versuchen Sie nicht, das mitgelieferte Netzkabel zu ändern oder zu verwenden, wenn es sich nicht um genau den erforderlichen Typ handelt.

Das System darf weder an eine Stromquelle angeschlossen sein noch eine Verbindung mit einer Telekommunikationseinrichtung, einem Netzwerk oder einer Modem-Leitung haben, wenn die Gehäuseabdeckung entfernt wird. Nehmen Sie das System nicht ohne die Abdeckung in Betrieb.

AVVERTENZA

Il sistema è progettato per funzionare in un ambiente di lavoro tipico. Scegliere una postazione che sia:

- Pulita e libera da particelle in sospensione (a parte la normale polvere presente nell'ambiente).
- Ben ventilata e lontana da fonti di calore, compresa la luce solare diretta.
- Al riparo da urti e lontana da fonti divibrazione.
- Isolata dai forti campi magnetici prodotti da dispositivi elettrici.
- In aree soggette a temporali, è consigliabile collegare il sistema ad un limitatore di corrente. In caso di temporali, scollegare le linee di comunicazione dal modem.
- Dotata di una presa a muro correttamente installata.

Non modificare o utilizzare il cavo di alimentazione in c. a. fornito dal produttore, se non corrisponde esattamente al tipo richiesto.

Prima di rimuovere il coperchio del telaio, assicurarsi che il sistema sia scollegato dall'alimentazione, da tutti i collegamenti di comunicazione, reti o linee di modem. Non avviare il sistema senza aver prima messo a posto il coperchio.

ADVERTENCIAS

El sistema está diseñado para funcionar en un entorno de trabajo normal. Escoja un lugar:

- Limpio y libre de partículas en suspensión (salvo el polvo normal)
- Bien ventilado y alejado de fuentes de calor, incluida la luz solar directa.
- Alejado de fuentes de vibración.
- Aislado de campos electromagnéticos fuertes producidos por dispositivos eléctricos.
- En regiones con frecuentes tormentas eléctricas, se recomienda conectar su sistema a un eliminador de sobrevoltage y desconectar el módem de las líneas de telecomunicación durante las tormentas.
- Previsto de una toma de tierra correctamente instalada.

No intente modificar ni usar el cable de alimentación de corriente alterna, si no se corresponde exactamente con el tipo requerido.

Asegúrese de que cada vez que se quite la cubierta del chasis, el sistema haya sido desconectado de la red de alimentación y de todos lo enlaces de telecomunicaciones, de red y de líneas de módem. No ponga en funcionamiento el sistema mientras la cubierta esté quitada.

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